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Skyways

Flight
Operations
•
Business
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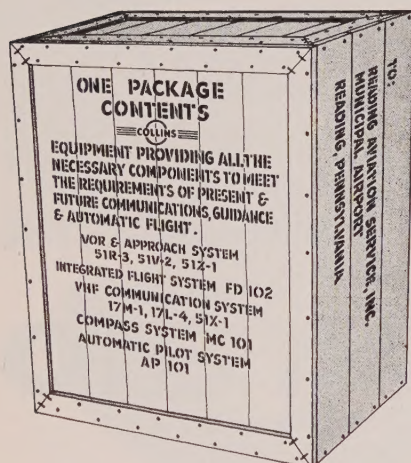


- Flight Operations Round Table: Air Taxi Operations
- Science Boosts Business Flying
- Weights and Balances

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The Magazine of Flight Operations

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FOUNDED BY J. FRED HENRY, 1942

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WEST COAST—Joseph W. Harbison, 6535 Wilshire Boulevard, Los Angeles 48, Calif.
Tel. OLIVE 3-3223



SKYWAYS is the authorized publication of
the National Business Aircraft Association.



Member Business Publications
Audit of Circulation, Inc.

VOLUME 15, NUMBER 2

SKYWAYS is published monthly by Henry Publishing Co., 122 East 42nd St., New York, N.Y. Printed in the U. S. A. Single copy; 50c. Subscription Prices. U. S., Possessions, Canada and Pan Am. Union, \$9.00 for 3 years, \$7.00 for 2 years, \$4.00 for 1 year; all other countries add \$1.50 per year for postage. Please give title, position and company connection when subscribing. Six weeks required for address changes (give both old and new). Manuscripts, drawings, other material must be accompanied by stamped, self-addressed envelope. SKYWAYS is not responsible for unsolicited materials. Accepted as controlled circulation publication at Bristol, Conn. Copyright 1956 by Henry Publishing Company. The following publications are combined with SKYWAYS; Air News, Flying Sportsman and Airways Traveler. All rights to these names reserved by Henry Publishing Co.

now hear this...

PERSONNEL

Robert S. McCulloch, president of Temco Aircraft Corp., was elected board chairman of The Aircraft Service Association at a recent meeting in Dallas, Texas. Douglass F. Johnson, president, Aircraft Engineering & Maintenance Co., Oakland, Cal., was elected vice chairman, and Harold Stuart continues as TASA president, in Washington, D.C. A. L. Harting, vice president, Southwest Airmotive became public relations advisor to TASA.

Rear Admiral Luis de Florez (USNR) has been named president of Flight Safety Foundation to fill a post that became vacant with the passing of Admiral John Towers.

Vernon W. Deinser has been promoted to the post of vice president and general manager, McCauley Industrial Corp., Dayton, Ohio, propeller manufacturer.

Paul C. Ackerman has been appointed to a newly-created post of director of engineering of the Engineering Div., Chrysler Corp., in line with the company's new plan for establishing each of its divisions as a separate self-contained unit.

Rear Admiral Frederick R. Furth, USN (Ret.) formerly Chief of Naval Research, has been named special assistant to the president of Farnsworth Electronics Co., div., I. T. & T. Corp., in charge of new product development.

George Link was elected to the board of directors of General Precision Equipment Corporation. The new GPE director is also treasurer of Link Aeronautical Corp.

Norman J. Asher has joined Piasecki Helicopter Corporation as administrator for Research and Preliminary Design.

Gordon J. Staub recently was elected treasurer of Curtiss-Wright Corporation.

Stuart G. Tipton, former General Counsel of the Air Transport Association, was elected president of the association by ATA's board of directors. **Frederick Davis** was named Director of Air Traffic Conference Enforcement Office of the Air Transport Association.

Robert M. Johnson has been appointed Assistant to Civil Aeronautics Board member Chan Gurney. Mr. Johnson replaces Frederick Davis who recently resigned.

A. P. Fontaine was elected vice president for engineering and a member of the administration committee of Bendix Aviation Corporation.

Kurt R. Stehling, rocket research engineer for Bell Aircraft, has been selected by the U.S. Navy to direct development of the rocket powerplants for the Navy's *Van-guard* earth satellite. He will be based at the Naval Research Laboratories in Washington, D.C.

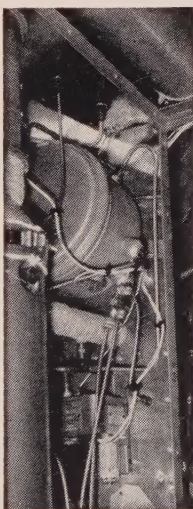
W. E. Smith was appointed head of the field engineering and sales division of Aircraft Radio Corporation. He will be assistant to Carl Cahill, ARC manager for military field engineering.

C. L. Davis has been appointed manager of planning for the Aeronautical Division of Minneapolis-Honeywell Regulator Co.

(Continued on page 51)



sky office with Janitrol heat



Executive Aircraft Service, Inc., Dallas, specifies Janitrol heaters for their conversions. In their one hundredth, pictured above, they used a unique tail installation. A standard "off the shelf" 200,000 BTU/hr Janitrol unit is located in the baggage section . . . making room for a forward commissary, yet using existing ductwork with little modification. In placing the heater aft, they capitalize on the DC-3's normal back-to-front ventilation flow.

Standardization and quick availability of parts are two of many reasons why builders, owners, and conversion specialists like Executive Aircraft Service choose Janitrol heaters—a line proved in thousands of military, airline, and business aircraft. Modification centers and chief pilots are invited to request on letterhead Janitrol's catalog, containing installation tips and the complete line of standard heaters from 25,000 BTU/hr up.

50 years of combustion engineering



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industry notes . . .

■ Braniff Airways recently announced the purchase of five Boeing 707 jet transports. Thus Braniff becomes the third U.S. air carrier to place an order for the Boeing jet aircraft. Delivery of the first 707 is scheduled for October, 1959.

■ A Lear L-5 autopilot has successfully completed an extensive flight test program in the French jet airliner, *Caravelle*, recently ordered by Air France for regular airline service. The L-5 installed in the *Caravelle* is a commercial version of the USAF F-5, first standard production autopilot to fly a jet aircraft successfully.

■ The world's largest turbine-powered transport helicopter made its first flight at Philadelphia International Airport in December. Designed and built by Piasecki Helicopter Corp., the 40-passenger YH-16A is powered by two YT-38 shaft turbine engines. The YH-16A weighs more than 16 tons, has a top speed of approximately 150 mph, and has a fuselage large enough to accommodate three Jeeps.

■ Lockheed, meanwhile, announced that it had delivered a new turbo-prop Constellation to the Air Force capable of a speed of 420 mph. A passenger-cargo multi-use transport, the YC-121F employs four P. & W. T34 can fly a 16-ton load non-stop across the nation in less than seven hours.

■ Trans World Airlines has begun inter-continental flights with its new Super-G Constellation transports from New York to Paris and Rome, and next month will begin service from West Coast to European points with the Super-Gs.

■ Eastern Air Lines recently placed an order with Douglas Aircraft for a jet fleet of 26 DC-8 airliners, 18 of which are scheduled for immediate production with an additional eight on option. Delivery is scheduled to begin May, 1959. This order represents an expenditure of \$165 million, including spare parts.

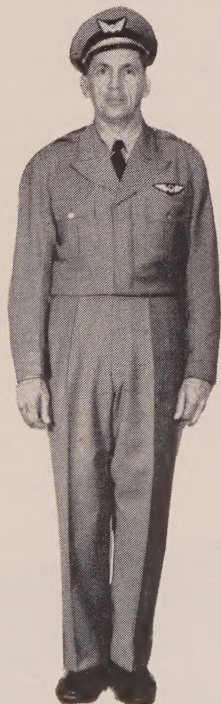
■ Hydro-skis, a development of Edo Corporation, are being tested for the first time on large seaplanes. Using a modified Martin *Mariner* with a single hydro-ski, these tests for the Navy have been underway since the early part of October.

■ North American Aviation has established the Rocketdyne Division as a separate group to carry on continued research, development and manufacture of high-powered rocket engines and related items. For 10 years NAA has been conducting extensive research and development of rocket engines, and the Rocketdyne Division is an outgrowth of NAA's Propulsion Center which has been concentrating on design and manufacture of liquid-propellant rocket engines.

■ Edo Corporation is designing floats for the Piper *Tri-Pacer*, and expects to have several designs available next year. Move was prompted by widespread acceptance of floats by Cessna 180 operators.

■ Aeroproducts propellers have been selected by American Airlines, Eastern Air Lines and Braniff to team with the Allison 501 turboprop engine in the new Lockheed *Electra* airliners these airlines have ordered for scheduled operation. The *Electra* will have 64 passenger seats, a lounge for six, and will cruise at 400 mph over a range of 2,000 miles.

■ Boeing Airplane Company engineers have overcome the basic problems of jet engine thrust-reversing and sound suppressing, according to a company announcement. Progress is continuing toward production development of the devices for installation on Boeing 707 jet transports now on order by the nation's airlines. The jet engine sound suppressors are designed to redistribute hot jet gases, in this way both reducing the noise and decreasing the radiation of what noise remains. It regulates the mixing of exhaust gases and surrounding air so that less noise is produced. Design of the nozzle concentrates the noise reduction in certain frequencies where the reduction is most desirable. The suppressors cause no appreciable reduction in available engine thrust.



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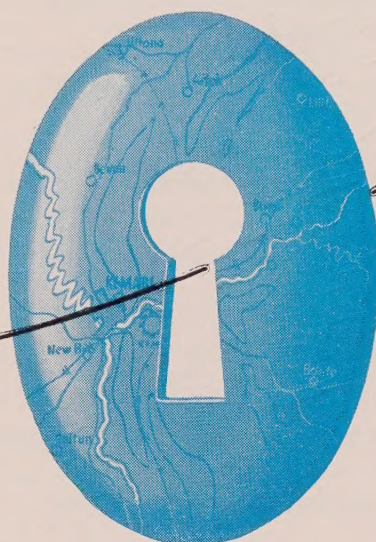
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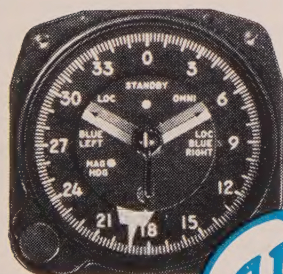
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Washington report ...

In its recent report to **Rowland R. Hughes**, Director of the Bureau of the Budget, the Aviation Facilities Study Group decried the dangerous deficiencies of the present air traffic control system and recommended creation of a cabinet-level post to study and prepare a 20-year master aviation plan.

The seven-member group, headed by **William Barclay Harding**, was appointed last May by **Hughes** to determine whether a study should be made of the long-range requirements for aviation facilities, including air navigation aids, air traffic control, airports, communications, and aviation growth in general.

Four specific areas for study were strongly recommended in the report by the group:

- (1) HOW TO MAKE MORE EFFICIENT USE of the national airspace by allocation and traffic control which is safe, efficient, and equitable for all users.
- (2) HOW TO INTEGRATE CIVIL AND MILITARY expenditures, particularly expenditures for research and development of aviation facilities.
- (3) HOW THE COST OF FACILITIES should be financed from private and public sources.
- (4) WHAT KIND OF GOVERNMENT ORGANIZATION is required to control use of the airspace and be responsible for the appropriate Federal interest in the construction and use of Government-financed military and civil aviation facilities.

The group also issued the strong warning that "Unless some urgent action . . . is taken to provide full time high-level leadership to the problem of bringing our aviation facilities in line with air traffic growth and the progress being made in aircraft development ever more dangerous conditions in the air can be anticipated.

NBAA actively participated in supplying background material for this report.

There is an ever-growing need for a public service radio channel to serve civil aircraft, particularly those engaged in business flying. The enormous growth of general aviation in the past decade so severely burdened the CAA control towers that the agency was compelled to discontinue accepting any communications other than those strictly of official nature.

To expedite coordinated consideration of this matter with other civil aviation organizations likewise concerned, NBAA has proposed that the Radio Technical Commission for Aeronautics (RTCA) refer this matter to Special Committee 56 for careful study and recommendations.

The members further warned that to make the kind of study recommended without placing it under independent central direction at a high Government level would be ineffective and wasteful of manhours and expense.

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Weight and Balance Solution for Executive Aircraft

The many and varied duties facing the business pilot before flight are such that he has little time to work a formal weight-and-balance solution, and may be further handicapped by the lack of any type of balance computer. On a number of aircraft, the change in balance occurring as the various fuel tanks are burned off is such that fuel management enroute is more exacting than determination of the initial configuration at take-off. Therefore, any practical solution should be almost instantaneous, capable of achievement without recourse to mechanical devices, and should extend coverage throughout the entire flight. If, when sufficient time is available, the best obtainable loading is once determined for each condition of flight, a record kept of

the loading sequence, fuel-management procedure and the resulting CG and weight, future problems are reduced to reference to those determinations, provided the same loading and fuel burn-off technique is followed. As with many problems containing several variables, a graphic presentation offers the advantages of collection and interpretation of the variables.

The solution offered here consists of plotting actual CG movement against GW in graphic form, for the optimum-loading conditions, together with a gross-weight reduction scale, enabling balance and weight to be found very rapidly at any time during the flight. The analysis may be drawn for any type aircraft, but once drawn is applicable only to that particular aircraft. The example calculations are

valid only for a Beech D18S with an empty weight of 6,030 lbs, an empty CG of 112.6", and 80-gallon nose tank, and an identical passenger-seating arrangement. The D18S was chosen for the example because it is a typical multi-tank aircraft requiring some thought on fuel management.

Basic weight and balance is not covered here. Complete coverage on that subject may be found in a number of standard works, among them Allan C. Sweng's "Flight Engineers' Manual." This article is confined to the general procedure for constructing a graphic loading solution, a brief resumé of practical considerations facing the business pilot, and observations on the facts disclosed by the demonstration problem. This is a "do-it-yourself project." The work in-

Accuracy $\pm .1"$ Figure 1. WEIGHT & BALANCE WORK SHEET

Items	Ferry			1 Passenger			2 Passengers			3 Passengers			4 Passengers			5 Passengers		
	Wt.	Index	CG	Wt.	Index	CG	Wt.	Index	CG	Wt.	Index	CG	Wt.	Index	CG	Wt.	Index	CG
Basic Operating	6573	724		6573	724		6573	724		6573	724		6573	724		6573	724	
Fuel, Full Tanks	1716	179		1716	179		1716	179		1716	179		1716	179		1716	179	
Passengers																		
1 Pass. @ Seat 4				170	31		170	31		170	31		170	31		170	31	
1 Pass. @ Seat 2							170	23		170	23		170	23		170	23	
1 Pass. @ Seat 1										170	22		170	22		170	22	
1 Pass. @ Seat 3													170	30		170	30	
1 Pass. @ Seat 5																170	35	
Baggage																		
Crew																		
Baggage in rear		15																
40# in rear comp.				40	10		40	10		40	10		40	10		40	10	
40# Forward of Seat 1.							40	4		40	4		40	4		40	4	
40# Forward of Seat 2.										40	4		40	4		40	4	
40# in Nose													40	1		40	1	
40# in rear comp.																40	10	
Total, all Items	8289	918	110.8"	8499	944	111.1"	8709	971	111.5"	8919	997	111.8"	9129	1028	112.6"	9339	1073	114.9"
Nose Tank	-480	-15		-480	-15		-480	-15		-480	-15		-480	-15		-300	-46	(rears)
Remainder	7809	903	115.6"	8019	929	115.8"	8229	956	116.2"	8439	982	116.4"	8649	1013	117.1"	8859	1044	117.6"
Rear Tanks	-300	-46		-300	-46		-300	-46		-300	-46		-300	-46		-204	-10	(49 gals. of Nose)
Remainder	7509	857	114.1"	7719	883	114.4"	7929	910	114.8"	8139	936	115.0"	8349	967	115.8"	8559	1001	116.2"
Main Tanks	-936	-118		-936	-118		-936	-118		-936	-118		-936	-118		-750	-94	(8/10 of Mains)
Remainder (Zero Fuel Wt.)	6573	739	112.4"	6783	765	112.8"	6993	792	113.2"	7203	818	113.6"	7413	849	114.5"	7623	884	115.4"
*Weight & 2 index units included in basic operating wt. & Index																	1 Refer to Loading schedule for fuel management procedure with 5 passengers	
																	-186	-5
																	7809	918
																	-186	-24
																	7623	894

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Figure 2 BEECH D18S LOADING SCHEDULE

Date _____

N _____

Empty Wt. 6030 lbs. Empty CG 112.6"

No. of Pass.	Successive order of Seating Pass.	Successive order of Baggage Loading	Max. Fuel	Fuel Distribution	Fuel Management	Notations
Ferry	-----	Crew bags in rear comp. (In nose at all other times.)	286	full Tanks	Burn Nose Tank first, followed by rear tanks followed by Main Tanks	Load Passengers & Luggage in reverse order of deplaning. (1st passenger off at intermediate stop to be last passenger loaded.)
1	1st Passenger @ Seat 4.	1st 40 lbs. in rear compartment	286	↓	↓	USE MAIN TANKS FOR ALL TAKE-OFFS AND LANDINGS.
2	2nd Passenger @ Seat 2.	2nd 40 lbs. Forward of Seat 1.	286			FOR OPERATION WITH LESS THAN MAXIMUM FUEL, OFF-LOAD FUEL IN SAME ORDER AS BURNED FUEL
3	3rd Passenger @ Seat 1.	3rd 40 lbs. Forward of Seat 2.	257	Restrict Nose Tank to 51 gals. remaining tanks full	↓	Compartments immediately forward of rearward-facing seats 1. & 2. are approved for 60 lbs each, hand luggage @ 111" from datum.
4	4th Passenger @ Seat 3.	4th 40 lbs. in Nose Compartment.	222	Restrict Nose tank to 16 gals., remaining tanks full.		
5	5th Passenger @ Seat 5.	5th 40 lbs. in rear Compartment.	187	Rears empty, restrict Nose tank to 31 gals. Main tanks full.	Burn Main Tanks down to 2/10 followed by nose fuel, followed by remaining main tank fuel. (Due CG)	

volved will consume the major portion of a day but, once completed, will provide effortless and exacting answers to all future problems on this subject. Materials required consist of graph and note paper, straight edge, latest CAA Form 337, and the aircraft operations manual.

The first step is to draw up rough forms for a work sheet and loading schedule similar to *Figures 1 and 2*, allowing sufficient spaces for passengers, baggage, and number of fuel tanks according to the type aircraft involved. Without forms, the arithmetic has a tendency to become misplaced. A pencil draft of *Figure 3* may then be prepared on graph paper. The ordinates will vary with different aircraft, and should be chosen to give reasonable accuracy and convenience in reading. The weight scale across the bottom should extend from approximately 400 to 500 lbs above the empty weight for a two-man crew (300 to 400 lbs for a one-man crew) to a weight slightly above the total weight with full tanks, maximum passengers and maximum luggage. At the approved maximum take-off gross weight erect a vertical line from the bottom to the top of the graph. If the particular aircraft is structurally limited to a landing weight other than the take-off weight, a vertical line should also be erected at that weight, and appropriately labeled.

On the left-hand margin erect a convenient consumed-fuel ordinate, divisible by five, which is nearest the consumption usually experienced.

Synchronize the fuel remaining and the elapsed-time ordinates to agree with the consumed-fuel graduations. At this position corresponding to dry tanks, measured upwards from the base line in gallons, draw a horizontal line. The slanting weight-reduction lines are next constructed by plotting gallons-consumed *vs* weight-reduced at six pounds per gallon at two separated points and connecting the plots. Subsequent lines are separated by any convenient poundage and may be duplicated geometrically. The lines do not include the weight of extra fuel burned during taxi, take-off, and climb. If desired, a correction scale may be constructed immediately above the dry-tank line so as to reduce any given weight by the appropriate determined amount. Duplicate the gross-weight scale along the top of the climb-correction section and label, "Instantaneous Gross Weight."

The balance portion of the graph may be expressed either in inches from the datum or % of the MAC, depending on the method to be used in determining the CG. If the operations manual contains a suitable graph solving the CG, its use will save considerable work. If a graph is not readily at hand or if greatest accuracy is desired, all balance reference points must be reduced to inches from the datum and the CG determined by the conventional formula:

$$\text{CG in Inches} = \frac{\text{Moment in Inch-Pounds}}{\text{Corresponding weight}}$$

Additional arithmetic may be saved by establishing a "Basic Operating

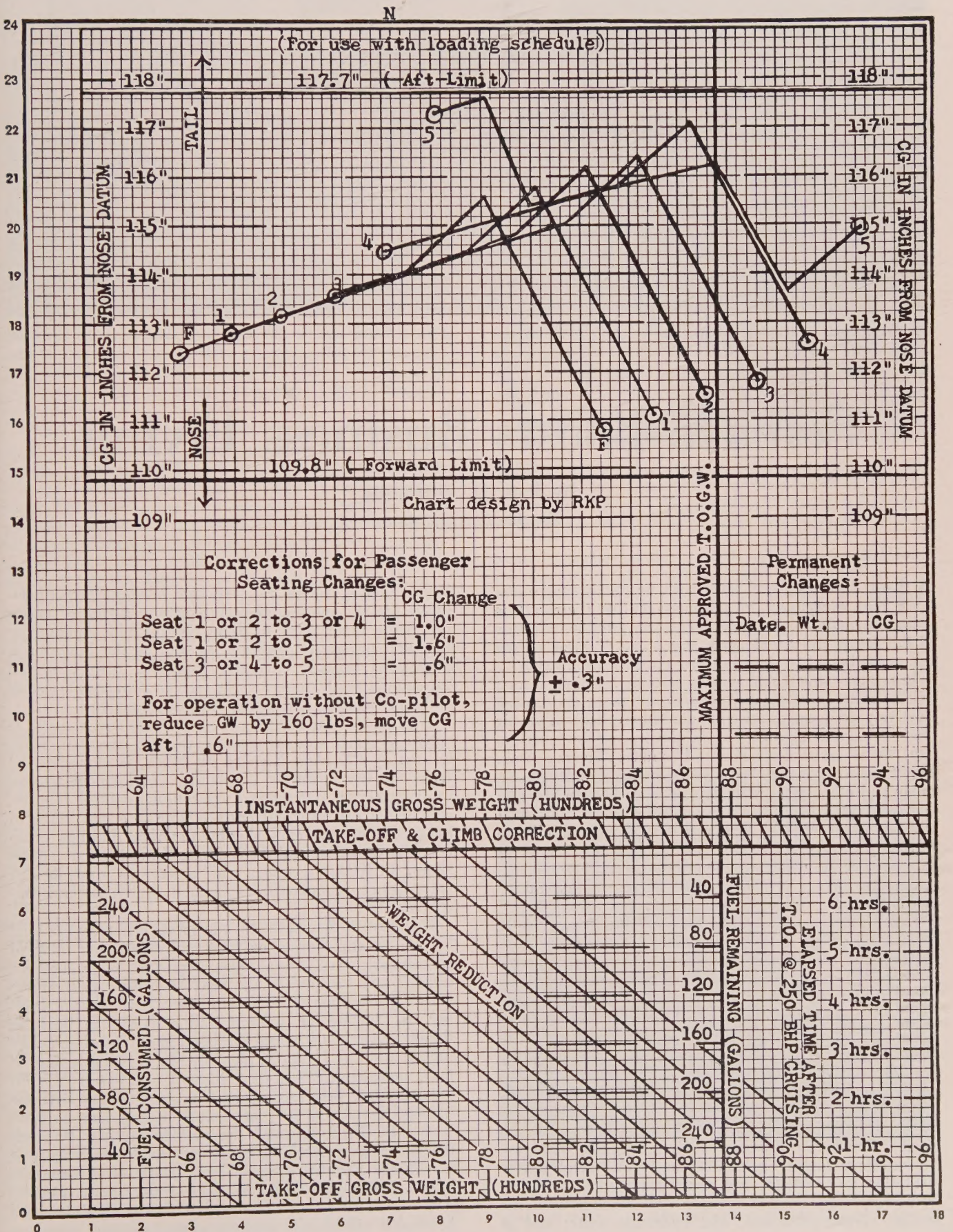
Weight and Index," which represents the aircraft on the ramp, ready to go except for fuel, passengers, and baggage. The empty weight and index is extracted from the current Form 337. Actual weights of pilots and average galley supplies should be used. Representative figures furnished for the example aircraft were:

Item	Weight	Index	Location
Empty Aircraft	6,030	679	
Oil	120	11	
Anti-icer fluid	20	2	
Galley supplies	13	3	@ Rear comp. door
Crew & Briefcase	320	27	@ Cockpit
Crew bags & Tool kit	70	2	@ Nose compartment
Basic Operating	6,573	724	

Prior to beginning the trial loadings, it is advisable to check the aircraft seating arrangement against the cabin plan drawing for which indexes are furnished. It will be necessary to compute the indexes if the seating differs or if indexes are missing for any baggage location. Odd index tenths may be safely rounded off to the nearest integral number.

The executive pilot is faced with several technical and practical considerations. Baggage compartment limitations and any special recommendations contained in the operations manual will, of course, apply. A common instruction is to burn fuselage tanks first. This distributes more of the total loaded-weight outward over the wing span, reducing the sheer
(Continued on page 49)

Figure 3. WEIGHT & BALANCE, BEECH D18S





LEARSTAR is cleaned-up modification of the Lodestar. This was developed by Lear in 1953/54. It cruises at more than 300 mph

TAS at 10,000 feet; at 270 mph TAS it can cruise for ten hours using only 100 gallons of fuel per hour. Rate of climb is 2,000 fpm.

Science Boosts Business Flying

by Jean H. DuBuque

Executive Director, NBAA

Most business flyers have read or heard somewhere that everything in advanced military aircraft is going automatic. If past experience is a reliable indicator of the future, they will agree that some of these refinements are bound to show up later on business aircraft.

In military supersonic weapon systems the pilot, if any, will be relieved of all decisions except those demanding relatively slow, deliberative human judgment. Even the air inlets of engines must vary automatically and probably the flaps, thrust reversal systems, and boundary layers as well. Flight controls, navigation, gun, camera, bombsighting, radar and other automatic systems must fit into less and less space, and many of their integrated operations soon will be "programmed." This will involve more miniaturization, probably telescoping various automatic systems into one lash-up using common master data references.

Clearly, the era of all-automatic flight is here, and we can anticipate profound effects on business aircraft.

Here's one reason why. We have an NBAA member in Lear, Inc., which is deeply involved in improving both military and business aircraft. We can be sure that Lear's accomplishments in advanced military equipment will be reflected just as rapidly as practical in new company-designed aids to business flying. It, therefore, seems to be a good time to make a case study of this NBAA leader in airborne automatic systems, which also produces the *Learstar* executive transport and a big family of communication and flight-control devices for business aircraft.

Lear's nearly 5,000 employees, including an exceptionally high proportion of engineers and scientists, are located at four major divisions. At Grand Rapids, Michigan, a seven-floor factory specializes in flight-control instrumentation and systems, and electro-mechanical products. At Elyria, Ohio, another division specializes in airborne pumps, valves, pneumatic and hydraulic units; and at

Santa Monica, where the corporate headquarters are located, are two more engineering-manufacturing divisions producing other types of flight control and communication and navigation systems, as well as the long-range, high-speed *Learstar* executive transport. Also, scattered throughout the U. S. and many foreign countries are sales and service offices and highly skilled technicians.

William P. Lear, who founded the company in 1930, is active as Chairman of the Board. An executive staff, headed by President Richard M. Mock, is characterized from the top down by substantial employment tenure, utilizing highly systematized operational control. The result is that Bill Lear currently is able to spend much of his time in Europe, exploring both markets and new product opportunities, and Dick Mock finds time to attend nearly all NBAA meetings and to serve as a member of the Aircraft Manufacturers Council of the Aircraft Industries Association.

Key spots in Lear executive brackets generally are held by men of engineering or piloting background, often of considerable professional fame. Mr. Mock is an engineer himself, and has been at the Lear helm through the company's greatest period of growth since 1948, always pushing its fundamental interest and activities in business flying. The Executive Vice President in charge of manufacturing, Andrew Haiduck, like Mr. Mock, is a graduate of the Guggenheim School of Aeronautics at New York University. Andy held top engineering spots in the airframe industry for nearly 20 years before joining Lear in 1948 when Mr. Mock assumed the presidency. Mr. Haiduck then successively broke production records as manager of two major Lear divisions—Elyria and Grand Rapids—before getting the nod for his present key title in 1955.

We don't need to list any further men or facilities here because it will become obvious, as the hardware successes

of this company are discussed, that the right skills and facilities have been brought together in a manner that hardly could be more fruitful. It may be that a look at the record and the trends will reveal why they have been so successful, and what this means to business flying. This, of course, is our purpose in these case studies, rather than to catalog people or brick and mortar.

No pun is intended when we say that the history of Lear is divided into three arts. Each of these arts represents a distinct grouping of technical skills, facilities and products in the respective fields of instruments and gyroscopic devices; electronics units and circuitry for the integration, conversion, amplification or communication of intelligence; and the servo mechanisms, such as actuators, clutches and motors, needed to control the flight attitude or various sub-systems of an aircraft. These are the fundamental arts involved in all airborne automatic systems.

As needs were foreseen during the last quarter century, company products representing each of these arts were given equal and parallel development emphasis, until the company has arrived at a point where all of the individual components are now being combined into advanced automatic systems. Sometimes several discrete systems are tied into one common master data reference source, such as a gyro-stabilized platform, which faithfully reports earth coordinates while gyrating through any conceivable attitude in space.

The firm regards this growth pattern as quite significant, pointing out that most companies in the field have concentrated on only one or two of the component arts. Some, for example, have made "names" in delicate instruments but have to buy their actuators or electronic components elsewhere. Some build flight instruments but no electronic devices or actuators. Some are strong on electronics alone. Many build custom gyros or actuators, to be used "off the shelf" in systems designed by others.

Comprehensive proprietary component design and production experience down through the years now is yielding special advantages in advanced systems, because when Lear engineers approach a new flight control or navigation system application, their latitude for circuitry innovation, miniaturization, or accuracy and reliability refinements embraces all but the simplest elements. In other words, a campaign for weight or volume reduction, increased reliability or expanded capabilities runs through the company's engineering groups without being qualified by any significant purchased part.

This special advantage first shows up in the company's analog computer work or flight simulation, where intimate familiarity with all of the components available permits the system designer not only to select the right ones but to redesign promptly any component in order to arrive at system compatibility and performance exactly meeting the need for the particular aircraft-application concerned. Theoretically, an isolated designer with an army of liaison engineers can call out to various vendors the exact component characteristics he needs, and some items off somebody's shelf will almost fit. In practice, Lear argues, nobody can design and produce an optimum system, and accept true system responsibility, unless he also directly controls component design, preferably with successful competitive experience in each component.

With these things in mind, the strides the company has taken in supplying thousands of autopilots for both business and military aircraft are not surprising. According to a company official, in one recent year, more of their autopilots were produced than all other makes combined. Many hundreds more, with new capabilities that would have seemed incredible only a few months ago, are now on order for the most advanced Air Force and Navy

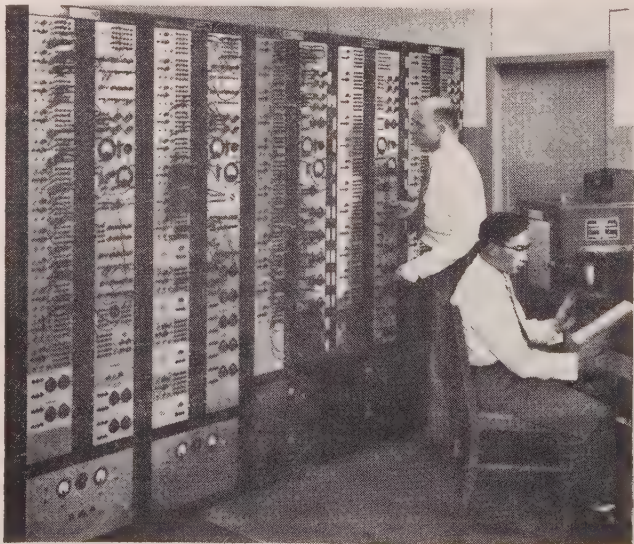


LEARCAL flight test pilot and sales engineering boss, Bill Vogel, flies company executives on business trips, when not flight testing experimental equipment. He also visits distributors nation-wide to demonstrate new products to show Lear's personal interest.

weapon systems, employing such techniques as stick force steering and programmed automatic weapon delivery.

In addition, Lear recently was awarded the contract for designing and building the automatic flight-control system for the first American jet transport, the Boeing KC135 *Stratotanker*, military sister ship of the 707 commercial transport. Considering the large potential volume involved in the jet-tanker program and the tremendous significance of this first autopilot application in America's jet transportation era, this probably was the most sought-

(Continued on page 41)



ANALOG computers are used at Lear for advancing development of tomorrow's automatic flight control systems for both military and business use. Computer enables engineers to simulate flight dynamics of aircraft together with actual flight control system.



DISCUSSION on air taxi operations in New York was attended by (left to right, seated) Hervey F. Law, general manager, airports service division, Port of New York Authority; Edmund R. Dawson, president, Lehigh Aviation Service; Richard Washburn, Southern Flight Air Taxi, Inc.; Sam Freeman, moderator, and president, Somerset Air Service; Ken Aldrich, Chief, General Operations Branch, CAA; William R. Waters, Northeast Airlines pilot; E. E. Iremonger, manager, tour sales, United Air Lines; (standing, left

to right) Harry Miller, president, Harry Miller Co.; Walter Laudenslager, president, Red Bank, Airport, Inc.; C. Cheever Hardwick, Smith, Barney & Co.; Marvin A. Everett, instrument flight instructor, Pan American World Airways; Frank Glennan, chief controller, New York International Airport; Herbert O. Fisher, chief of aviation development division of Port of New York Port Authority; N.Y.C. and John Groves, eastern regional operations manager, Air Transport Association, New York City.



“Air Taxi Operations”

*Panel Finds Auxiliary Carriers Meet Increasing Public Demand.
Though Need to Become Better Known; Says Services:*

- Maintain Scheduled Airline Standards
- Fly to Many Off-Airline Points Exclusively
- Want Regulatory Assistance from Government
- Need to Have Airline Instrument Ratings
- Face Faster and Stricter Enforcement
- Find Airports Co-operative with Landing Problems
- See Need for Low-Altitude Obstruction Charts
- Visualize Future for Vertical-Rising Aircraft

Moderator Sam Freeman (Pres., Somerset Air Service): “Gentlemen, our subject today involves air taxi operations—specifically, the problems of safely operating our air taxi aircraft into and out of some of the busiest airports and in a manner offering the least amount of interference with the heavier traffic, i.e., the airlines and the larger corporate aircraft.

“These problems fall into three categories: the first is control of traffic in the air; the second is control of the air taxi aircraft on the ground—gate accessibility, ramp space, baggage handling, prop wash problems from larger aircraft, etc; and a third category is sales promotion, reservations, ticketing, etc., and is concerned primarily with airline personnel. We have with us today a pretty varied group which should result in interesting discussion. We have three air taxi operators as well as a couple of air taxi passengers, and airline and airport personnel. One

thing we should keep in mind is the fact our air taxi aircraft are well equipped and are flown by commercial pilots, often with extensive backgrounds of flying. These pilots should not be confused with the private pilot who may be on his first visit to the New York area and who frequently becomes mixed up as to which airport is which, which frequency to use, etc. As a general rule our pilots may not be as skilled as airline pilots, but in many cases they are. Actually, some of the boys are ex-airline pilots.

"Air taxi is a growing segment of our national air transportation picture. The 107 members of the Air Taxi Conference, which we estimate represents only about 25% of the total air taxi work, last year flew nearly 6,000,000 revenue miles and carried over 80,000 passengers. The CAB believes that air taxi aircraft offer many thousands of smaller communities their only means of airline travel. In other words, residents of these communities depend on air taxi aircraft to connect their communities with the trunk line terminals.

"To get on with the discussion—and referring first to the air traffic and of air taxi operations, I would like to ask Mr. Laudenslager to state some of the problems he has faced in operating in the highly-congested New York area."

Walter R. Laudenslager (Pres., Red Bank Airport, Inc.): "The air traffic problem is most acute, of course, in such high density areas as New York, Los Angeles, Chicago and possibly Miami. New York probably is the most difficult. When air taxis began working under the interline agreement with the airlines in 1952, we had to feel our way along. I was very pleased with how quickly we were able to work into the transportation system of this New York area, that is, how quickly we came to be accepted by the towers and how quickly the tower people understood what service we were endeavoring to provide and how they enabled us to get in and out of the airports with a minimum of delay. The situation improved year by year. Then in the latter part of 1954 we began to feel the pressure of this high-density set-up and we began to be uncertain about whether or not we could get our passengers into either Idlewild or LaGuardia. One day we would be accepted VFR even under marginal conditions, and the next day we would not be accepted VFR even though the conditions were better.

"Legally, we cannot fly IFR in single-engine aircraft. However, if we request and are accepted VFR even though the conditions are marginal, then we are legal and are under CAA jurisdiction to come in. As of last year we



AIR TAXI PILOTS should become familiar with high-density airport traffic routines, says William Waters, Northeast Airline pilot.



ROUND TABLE PARTICIPANTS

SAM FREEMAN, moderator, president, Somerset Air Service; helped start Somerset Airport, N.J.; pioneered and organized National Air Taxi Conference; pres., National Aviation Trades Association; 4000 hours mostly in light planes.

KENNETH R. ALDRICH, Chief, General Operations Branch, CAA, four years; aeronautical degree, Univ. of Mich.; four years, Naval Aviation; four years, Consolidated Aircraft; 17 years with CAA in field work, flight testing training, certification.

EDMUND R. DAWSON, glider-sailplane, Navy fighter pilot in Pacific; joined Wiley Post, Jr., to form Lehigh Aircraft Co., flight training; heads Lehigh Aviation Service, air taxi, and Aviation Service Associates, maintenance.

MARVIN EVERETT, soloed in 1930 and has 8000 hours multi-engine and 3500 hours single-engine time; holds CAA instrument examiner and airline transport rating certificates; also gives instrument training to private pilots.

FRANK GLENNAN, controller, Chicago (Midway) tower, 1944-49; chief controller, Lansing, Mich.; 1949-51; chief controller, Cincinnati (Lunken), 1951-53; assistant chief controller, LaGuardia tower, 1954-55; chief controller, N.Y. International (Idlewild), March, 1955.

JOHN R. GROVES, regional operations manager, Eastern Region, Air Transport Association, since 1948; previously manager of Washington National Airport, Washington, D.C.

WALTER R. LAUDENSLAGER, president, Red Bank Airport, Inc., N.J.; past pres., NATC; fixed base operator since 1929; commercial pilot 10,000 hours; operated government flight-training school in World War II.

HERVEY F. LAW, soloed glider, 1914, plane, 1917, taught flying, Signal Corps, 1917-18; airport engineer, Bureau of Air Commerce, 1934; regional supervisor, airports, Region 1, CAA, 1939; manager Washington National Airport, 1943; present post, 1947.

HARRY MILLER, president Harry Miller Co., Red Bank, N.J., is an enthusiastic user of air taxi services as manufacturers' representative for several companies making high-fidelity reproduction components.

RICHARD R. WASHBURN, purchased Charlotte, N.C., operations Southern Airways, 1949, and formed Southern Flight Air Taxi, Inc.; with Southern Airways, Atlanta, Ga., and Charlotte; degree, Univ. of Arkansas, 1941.

WILLIAM R. WATERS, soloed Falmouth, Mass., 1940; joined NEA as co-pilot, North Atlantic Division, 1942, transferred domestic division, 1943; plane commander, NATS, 1943-45; member QBs; 12,000 hours multi-engine time.

were very happy about that situation because we thought we would not have anything to worry about. But this year, it has come to be a problem, not because of our relations with the towers but just because of the traffic situation in this area. Perhaps the handling of air traffic has reached the saturation point. I feel very strongly, however, that if the air taxi industry is going to grow, we will have to have some changes in regulations in high-density areas. The air taxis have a VFR type of approach; the airlines have an IFR type. I think it is going to be necessary for the CAA to write special regulations to take care of the air taxi category. This may shove IFR traffic up a little higher, and then let controlled VFR come in and use radar approach or radar departure . . . and all in absolute safety.

"I'd like to cite an example. Very often I go to Washington for meetings in connection with air taxi work. One day I was flying to Washington in our Bonanza demonstrator that had one radio, that is, one transmitter and one receiver. All aircraft in our taxi fleet have a minimum of two communicating systems plus two navigation radios. When I got to Baltimore I requested permission to come in controlled VFR. At the time they were giving 2½ miles and 1500 feet, and they instructed me to hold right where I was for clearance. When I got the clearance, they instructed me to go to 12,000 feet. But with a 1500-foot ceiling I wouldn't accept the clearance. I will fly IFR in a single-engine airplane if I'm all by myself, but I won't with just one radio. Instead, I landed at Baltimore and then went up to the CAA communications station. I sat there from about 9:30 until 12:30 and never could get them to accept a controlled VFR clearance in underneath, even though the visibility went to 3 miles and the ceiling went up to 2500 feet. The only way they would accept me was to go on up the stack and then get down eventually. I missed my meeting and had to come on home.

"What I am trying to bring out is that we should be allowed to fly controlled VFR. We can fly holding patterns, etc., but we should be allowed to do it at the lower elevations, not up in the stack with the bigger aircraft." **Sam Freeman:** "Ken, will you make some comment on that?"

Ken Aldrich (Aviation Safety, CAA): "Walt, was that incident at Baltimore during the high density control procedure?"

Walt Laudenslager: "Yes, it happened about two weeks after that started."

"CAA AND CAB are considering new proposed CAR 47 for air taxi operations," says Ken Aldrich, Chief, Operations Branch, CAA, "which will recognize them on their own merits and take them out from under CAR 42 designed for irregular carriers."

Ken Aldrich: "Under that set-up, of course, it required two-way radio control and it also allows the Washington Airport to refuse flights when traffic is saturated. I'd say in this particular case, the boys were within their rights to do what they did."

Walt Laudenslager: "Yes, they were legal."

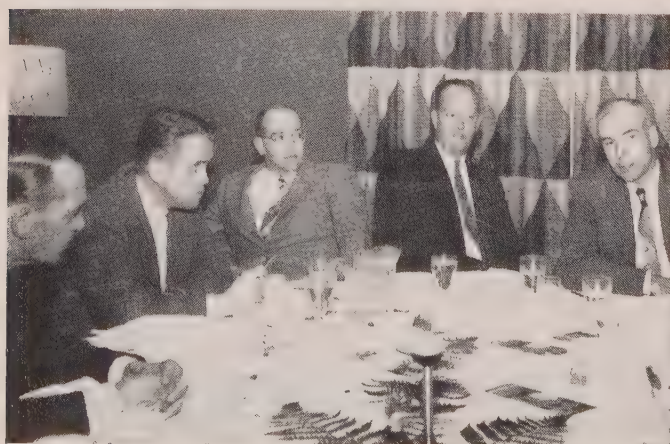
Ken Aldrich: "In connection with your basic problem of controlled VFR and IFR operations, the CAA and CAB have been discussing the new proposed CAR 47 for air taxi operations, in which these operators would be recognized on their own merits. As you all know, they now operate under CAR 42 which originally was designed for the larger irregular carriers. The growth of the air taxi category has come about since then. Both the CAA and the CAB now realize the need for recognizing the air taxi as an essential element of our air transportation system.

"A controlled approach has been on the books for some time. The traffic clearance would allow for clearance into the airport below IFR minimums if you were operating without passengers, as you mentioned you were. In fact, according to our lawyers, under such conditions operations are permitted down to zero-zero. Therefore, in the past few weeks there's been active study of that situation by our legal department. When I left Washington, our lawyers were in the process of considering formal recommendations to the Board to change the traffic clearance concept as it applies to VFR operations.

"From an air taxi standpoint, the CAR 47, as it is proposed, will allow certain IFR operations by single-engine aircraft. The smog condition in Los Angeles is one which, technically, often goes below VFR minimums. The air taxi operators are complaining that they are being penalized by this normal California atmosphere. In another instance, certainly you should be allowed to operate IFR above broken clouds in a single-engine airplane where there is a reasonable amount of VFR minimum ceiling for a breakout underneath. If you accept and recognize the need for air taxi operations under single-engine IFR conditions, then you are going to have to recognize the necessity of the pilot being capable of operating under at least semi-instrument conditions.

"As far as we are concerned, we feel the air taxi operators must face up to the fact that the pilots who are flying air taxi operations must be capable of instrument flying at least to the degree now required in the present instrument rating, that is, to at least stay right side up
(Continued on page 42)

"AIR TRAFFIC PROBLEM is most acute in such high-density areas as New York, Chicago, and possibly Miami," says Walter Laudenslager, president, Red Bank Airport, second left, "and I am very pleased with how very quickly we worked into New York fields."





TOP STANDARD OF THE AVIATION WORLD

me almost stands still for you as you cruise above earth-bound traffic in a new Beechcraft Bonanza for '56. You can whisper — that's all the Bonanza does — in the quiet of the soundproofed interior. It's stronger, safer, faster, has more visibility and luxurious flying comfort than any competitive aircraft. This marvelous Beechcraft gives you 184 miles-per-hour on less fuel than it takes to operate most automobiles. *That's efficiency!* And *that's* what your business will have when you put a 1956 Beechcraft Bonanza to work for you.

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SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business



USAF/CAA-suggested aircraft markings to facilitate identification are these shown on Capitol Airways' C-46. Numbers stand 18 inches high and cover a 9-foot area on plane

Capitol Airways Uses New Plane Identification System

Nashville, Tenn. In an effort to aid simplification of the problem of air-to-air identification of aircraft, Capitol Airways is enlarging its aircraft markings.

The new numbers are 18 inches high and cover an area 9 feet long. This marking system was proposed by the Air Force and the CAB. (Ed note: see January SKYWAYS' Round Table on Aircraft Identification.)

Center-Line System to be Installed at LaGuardia

New York, N. Y. In order to meet the air traffic needs at LaGuardia Airport, the Federal Government, through the CAA, has advised the Port of N. Y. Authority that modernization of the approach lighting system at LGA is essential. This modernization involves installation by the CAA of an up-to-date center line approach lighting system to the instrument runway (4-22). To accommodate this installation, the Port Authority has authorized acquisition of land southwest of the runway.

Installation of the new lighting system is scheduled to begin in July, 1956.

Piper Readies Comanche For 1957 Business Market

Lock Haven, Pa. Piper Aircraft Corporation presented preliminary data and drawings of its new *Comanche* to its distributors attending Piper's annual sales meeting in Lock Haven. The new all-metal, low-wing, four-place *Comanche* will be powered by a Lycoming engine and will feature a retractable tricycle landing gear. Scheduled to fly in 1956 and be on the market in 1957, the *Comanche* was designed to meet the need of a medium-priced high-performance business plane, and will supplement Piper's existing line of aircraft. Production tooling for the new airplane already is underway.

Port Authority Plans Spring Improvements at Newark Airport

New York, N. Y. The Port of New York Authority recently announced plans for improving Newark Airport to meet the needs of increased air traffic at the New Jersey terminal.

The improvements to be undertaken in the spring of 1956 include a new 4400-ft taxiway to cost an estimated \$757,200. This will provide a dual taxiway system for Runway 4-22. The new taxiway (75 ft wide), parallel to the runway, will extend from the Passenger Terminal apron to a point north of the Bound Creek culvert. There it will connect with the existing parallel taxiway. This improved taxiway system will expedite aircraft movements

on the runway and will facilitate use of the runway for take-off to the north over the Kearny meadows under the NATCC preferential runway pattern.

The planned improvements also will include 16 additional paved aircraft parking positions in two locations south of the Brewster hangar and east of the Air Mail & Express Building. The apron in front of the Brewster hangar will be widened. Also, a new access taxiway will be provided from the passenger terminal apron to the leased apron area adjoining the Brewster hangar.

A paved warm-up area will be provided at the west end of Runway 11-29 to permit aircraft to run up engines prior to taking off to the east over Newark Bay.

A dual power supply for the new airport surveillance radar equipment (ASR-3) will be installed. This second installation will provide power automatically should the main power supply fail.

Southern Flight Service Named Camair Distributor

Charlotte, N. C. Officials of Camair, a division of Cameron Iron Works in Galveston, Texas, have announced that Southern Flight Service, Inc. will distribute the Camair 480, twin-engine executive plane.

Southern Flight Service is an authorized CAA Repair Station, and the company's services include instructions, aircraft storage, automotive rental, and aircraft rental. The company also has a large air taxi division and a used airplane division.



PIPER COMANCHE, new four-place, all-metal business plane, is scheduled to go on the market in 1957. The plane is designed to meet need for medium-priced company aircraft

Richard R. Washburn is president of Southern Flight Service, located at the Charlotte Municipal Airport.

Winslow Engineering Installs New Full-Flow Oil Filters on DC-3

Oakland, Calif. New installations of full-flow oil filters on DC-3 and DC-4 aircraft have been made by Winslow Engineering Co., following CAA approval of this equipment. The Winslow filter is based on the patented CP (Controlled Pressure) element which was designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil without opening by-pass valves. This is accomplished by using two types of filter material, each of different density, which provides dual flow capacity.

The installation of these filters is simple and requires only 4½ man-hours per engine. The elements are changed every 200 hours.

Reports from Pan American World Airways on filter protection show savings in replacement parts of \$923 per overhaul.

Southwest Airways is completing installation of filters on its fleet of DC-3's.

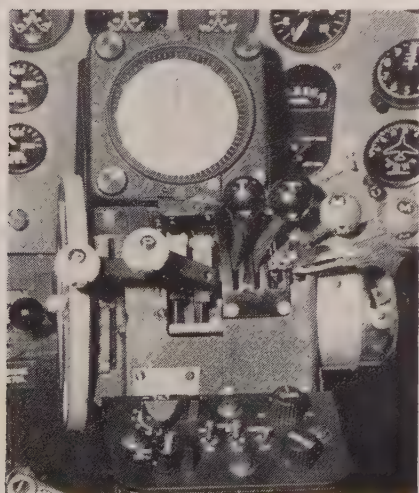
Scott Paper Co. DC-3 Gets C-Band Weather-Mapping Radar

Reading, Pa. The first RCA "C" band weather-mapping radar system to be installed in an executive-type DC-3 recently was completed by Reading Aviation Service, Inc. The work was done in RAS' Electronics Shop.

The radome on the Scott DC-3 was fabricated by Chamberlain Aviation, of Akron. This dome incorporates the 22-inch antenna and permits easy access to the forward side of the instrument panel.

The Scott Paper Co. DC-3 is skippered by Capt. Welles Forbes. His copilot is Herb Erdman.

National Dairy Products' DC-3 is scheduled to have a similar installation made in the Reading Aviation shop.



PPI SCOPE is mounted in instrument panel, radar controls are mounted on the pedestal

... in the business hangar

Magnolia Petroleum's chief pilot, Sam J. Willis, brought his company's *Aero Commander 520* to Horton & Horton Custom Works for a new interior. This is the third plane of the Magnolia fleet which Horton & Horton have done. The genuine leather trim used in all the Magnolia aircraft is especially dyed and is now carried by Lackawanna Leather Company as "Magnolia Brown." M. W. Patterson is Magnolia's NBAA representative.

One of Great Lakes Carbon Company's DC-3's has been in the Remmert-Werner shop for installation of a Sperry A-12 autopilot with altitude and automatic approach controls. Charlie Sharp is Great Lakes' chief pilot and NBAA man.

Larry Montigny, chief pilot for Dresser Industries, recently test-hopped the company *Ventura* after completion of work on it by Southwest Airmotive, Dallas. SAC installed outer-wing fuel tanks, modified the bomb bay to incorporate baggage compartments in lieu of gas tanks, redesigned the interior of the airplane, and installed new type engines equipped with low-tension ignition and an improved carburetor system. In addition, the *Ventura* underwent an 8,000 hour overhaul. Larry is also his company's NBAA representative.

Odessa Natural Gasoline Co., of Odessa, Texas, has had its *Lodestar* in the Executive Aircraft Service shop in Dallas for 100 hour inspection, dual fuel system installation, and a new interior. Odessa's pilot, Ray Hodge, brought the plane to Dallas.

Steve Doss brought The Emhart Manufacturing DC-3 to Remmert-Werner for installation of an auxiliary heater, an engine change, weight and balance work, and an annual inspection.

Olan Mills, owner of the chain of Olan Mills photographic studios, recently bought a new Piper *Apache*. He will use the plane as liaison between his studios located throughout the country. It will be based at Southwest Airmotive.

The Nello-Teer Construction Company of Durham, North Carolina, has had its De Havilland *Dove* at Butler Aviation (New York) for extensive rework. The engines were given a top overhaul, the main wing spar and center section were modified, and the ship was relicensed. Rod Hudson is Nello-Teer's pilot.

E. P. "Cotton" Jeter brought Union Producing Company's DC-3 to Dallas and Executive Aircraft Service for miscellaneous repairs and installation of modified oil tanks and system.

Big Three Welding & Equipment Co., Houston, Texas, recently bought a deluxe Executive Super-92 DC-3 from Remmert-Werner. The -3 is equipped with a Collins 17L-51R VHF multi-channel communications, dual Collins 51R omni and ILS, dual Bendix ADF, standby VHF, a Remmert-Werner 10 watt, 8 channel isolation amplification, with dual ARC cockpit speakers, three-light marker, custom radio and instrument panels, and R1830-Super 92 engines. Cabin of the new -3 features extra large cabin and picture windows, 14-place interior, and electrically retracting airstair door. The company previously operated a Model 50 *Twin Bonanza*. Pilot is Ed Brewer.

Bob Lyle, head of Executive Flyers, Inc., new executive aircraft leasing company, had his company's *Lodestar* at Southwest Airmotive for minor repairs.

Jack Mitchell and Jake Romeis brought the DC-3 belonging to Gulf Research & Development Co., Pittsburgh, to Executive Aircraft Service for 100 hour inspection, an engine change and miscellaneous repairs. When the work was completed, the boys and the -3 took off for Venezuela for aerial surveying.

Scripps Howard's B-23 is back in operation after installation of picture windows by Pan Air Corporation, New Orleans. The plane is based at Caldwell Wright Airport, New Jersey, and is piloted by R. F. Sliker.

Bob MacFarlane has had the Northern Ordnance Company B-25 in the Wipflinger Aircraft shop for a double engine change. The plane is based at Minneapolis.

The L. L. Irvin Company, Lexington, Ky., has had its De Havilland *Dove* at Dallas Aero Service for top overhaul and installation of augmentors and heaters.

Dick McNally brought Freeport Sulphur Company's Grumman G-21 to Pan Air Corporation for 1,000 hour overhaul, double engine change and "metalizing" the wings.

Augmentors and heaters have been installed by Dallas Aero Service in ComfoSleep Company's *Dove*. Home base for this *Dove* is Wakarusha, Indiana.

Phil Sales, pilot for Albert Trostel & Sons, Milwaukee, has had his company's D18S at Southwest Airmotive for 100 hour inspection. While in Dallas, Phil visited with Tony Neyland, former chief pilot for Trostel and now Delhi Taylor pilot.

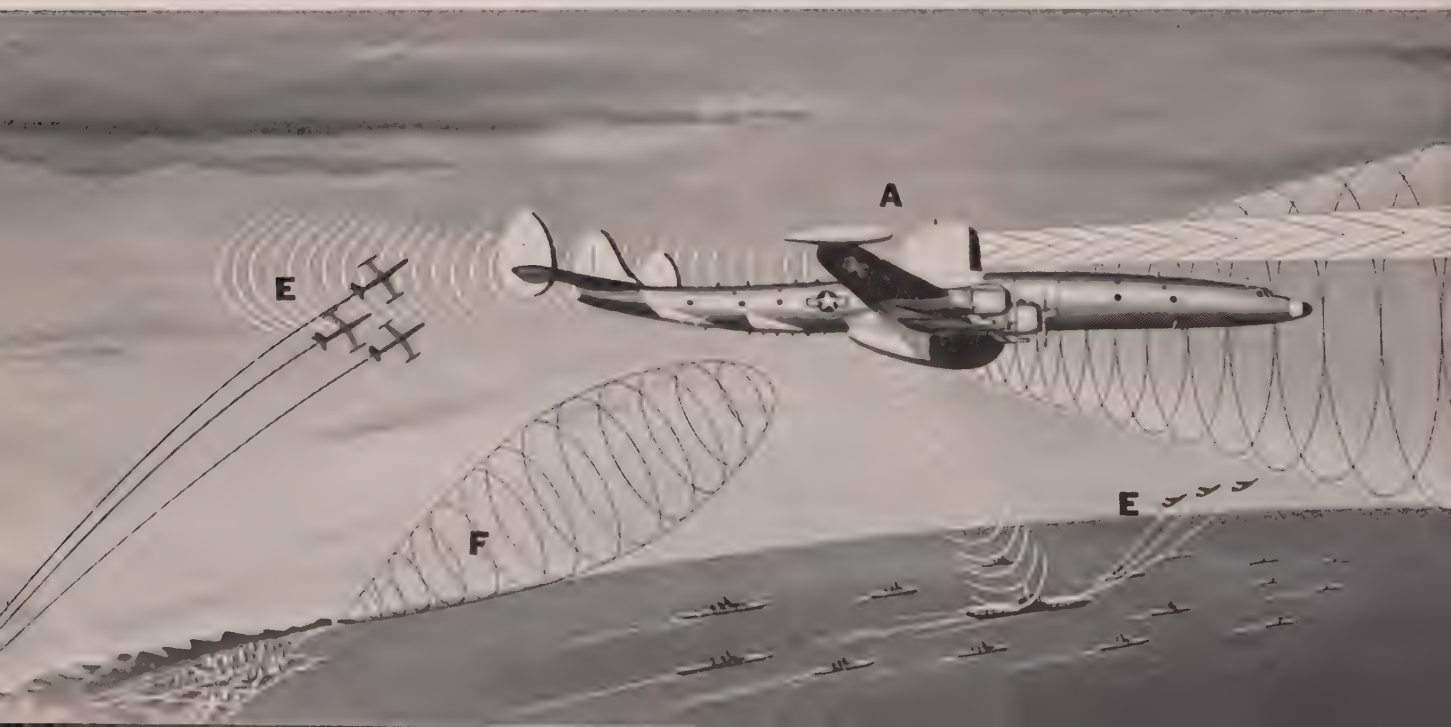
New U.S. Concept for TOTAL DEFENSE

In this age of awesome airborne nuclear weapons, a vast umbrella of airborne electronics will safeguard our nation against sneak attack



BELOW—A WEAPONS SYSTEM IN ACTION. An electronics-laden Super Constellation early-warning plane (A), patrolling our outermost defense perimeter hundreds of miles from our shores and borders, from its high altitude can “see” beyond the horizon and detect both

high-flying and low-flying enemy aircraft (B). Using its powerful search radar (C) and height-finder radar beam (D) to pinpoint position of invaders, the patrol plane alerts our interceptors (E), which swarm aloft and are radar-guided through fog or darkness to intercept and



Navigation **NAVICOM** Communication

Procedures, Regulations for Navigation, Communication in Flight Operations

Jeppesen Offers Pilots One-Setting R-2 Computer

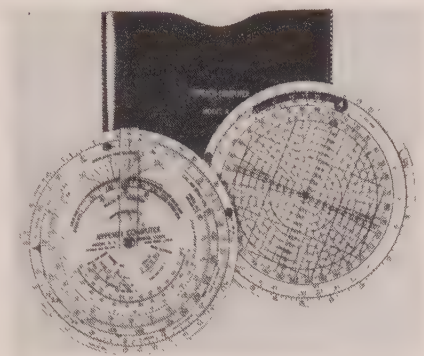
If ever a criticism was leveled at this department, it was that we appear primarily concerned with matters of major importance to "professional" pilots, as compared to pilots of so-called "private" or novice status! To this allegation, we readily concede the possibility of guilt, because it is our experience and belief that we have never met a non-professional pilot of any worth, regardless of his number of hours, whose pride or ambition was not to consider himself at some time equal to professional standards of skill. For this reason, personal-plane owners and other pilots of novice grade study and train to acquire commercial and other ratings of higher degree with no desire or intent to ever fly for hire.

So it is that *Navicom* applies itself to serve the interest and needs not only of work-a-day professional pilots, be they airline or executive, but also of the more mature group of non-professional pilots, as distinguished from the "flying enthusiast" or weekend local sportsman pilots who are served by other publications in the general aviation field.

Hence, when we come across a new piece of equipment, or a changed procedure or an improved accessory or pilot's tool that will make flying safer, easier or more accurate and efficient, it is our pleasant duty to examine and report on it. This leads up to the introduction of a new form of a familiar cockpit gadget, variously described as a computer, confuser or calculator, depending on how you were brought up.

For all the years of cross-country flying, somebody is always coming up with a new one, most of them round, some elongated with more arm-like appendages flailing about than an uncooperative stewardess. The round type have garnered the market for their convenience, although lacking some of the plotting capabilities of the E6B and ilk. Solving wind-triangle problems in dark cockpits in rough air with anything less than a plotting table has made many a harassed crew or lone pilot resort to rule-of-thumb and his trust in God.

We do not mean to imply that Jepp's new R-2 computer will supplant the latter item, but we do know and state that there is no longer any excuse for the former. Like the Castro Convertible ads, even a child can make it



work! The first time you try it, you are impressed with the ease of your success. We mean the computer, of course!

Equally unique is the new method of calculating True Air Speed, with results in excess of 2½% greater accuracy at today's higher airspeeds. Also, one setting of the computer automatically converts all readings interchangeably from knots to MPH or the reverse, making it simple to employ alternately charts or figures specified in either system.

The R-2 computer works equally well for high-altitude or low-altitude flying, for light aircraft or jets.

With the computer, Jepp supplies one of the most complete and lucid explanations and navigational texts that it has been our pleasure to see. With his incomparable sense of humor, he illustrates the text with examples designed to make the explanations easy reading.

The computer and the text book are a delight to have and use, and include some fine additional hints on easy use and in-flight techniques. We would like to mention, however, that whereas he offers the small pocket-size edition for uniform "shirt-pocket" use, and labels the six-inch diameter version "for navigators, dispatch and office use," we respectfully suggest that the latter is ideal for very old "line Captains" and such other crew octogenarians that the stewardess normally assists down the unloading steps after the passengers leave. It will fit into the side pocket of the usual uniform jacket as well as into that fine new Chart Case of Jepp's where most of them go anyway. What a thrill it was to take this one out and try it at night in a dimly-lit cockpit in rough air without having to use a jeweler's eyepiece! And oh yes, they have a 30-inch "classroom model" for very old Captains!

"Flying the Omnirange" Now in Third Edition

It may seem incredible to many pilots that there is a substantial market for an up-to-date, simplified text on omnirange flying. The VHF airways system has been with us so long now that just about every active pilot should be completely at home with it and thoroughly conversant with its associated facilities and advantages. The number of new pilots obtaining their licenses and/or coming out of military aviation into civil flying is not the sole justification for this third revised edition of probably the best text on the subject, last issued in 1952.

Since that date, the omnirange airway system has been completed (although in a continual status of site-changing, frequency revision, etc.); DME has been added to an increasing number of locations; equipment has been modified, improved. New equipment, such as course-line computers, has been introduced to develop the full ability of VOR, flying accurately to any point by direct course, etc.

As before, the text explains in terms familiar to the novice, how to fly a VOR course, how to take and plot bearings and cross-fixes. In one excellent chapter it takes the reader through a complete VOR cross-country although it falls down in this instance by not including a sample of the use of DME to keep a constant check on actual position without the onerous chore of plotting VHF lines-of-position on a chart held on the pilot's lap in rough air or on the gauges! Similarly, the authors failed to take proper note of the existence of the VHF airways course-lines now on every chart that usually eliminate half of the pre-flight or in-flight calculation of heading as well as one-half of the cross-fix plotting chore.

This small omission by no means can be considered a severe deficiency inasmuch as, in a subsequent chapter, the authors, Charles A. Zweng and John Dohm, describe the use of DME for both enroute flying, course changes and instrument approach purposes.

And also in a later chapter, they present a good example of how course-line computer flying works, stripped of most of the highly technical data analysis that usually comes with these explanations and probably of much interest to even professional pilots thor-

oughly familiar with VOR/DME use but still a little confused as to what and why a course-line computer system has to offer them.

Along with a competent and frank review of the available airborne equipment at time of going to press, the book includes a much-needed section on accuracy and maintenance, this being the crux of all successful and safe VHF navigation.

Practicing professional and advanced non-professional pilots may object to the over-simplification of the subject of ILS Localizer course flying embodied in the suggestion "Follow the needle." Needle chasing on low ILS instrument approaches, rather than proper techniques of Blue/Yellow sector interpretation, rate of needle movement and subsequent heading corrections, is hardly the method to be stressed in such a text. However, in fairness, it should be realized that the authors are not trying to supply a home correspondence course in low approaches and the explanation suffices for familiarization purposes.

It is interesting to note that the Tacan vs VOR/DME controversy is briefly covered in a chapter all by itself. As time goes on since the hot controversy has simmered to a slow boil, the conclusion drawn by the authors that VOR/DME is not about to be shouldered out in the foreseeable future is increasingly borne out by later information that TACAN is not only in unjustifiable confliction with DME but with much more urgently needed radar safety beacons. Improved VOR/DME by 1960-1965 may make the expense and anguish of change-over to any other system unthinkable, and radar advances in traffic-control techniques with the advent of airborne transponders in civil aircraft effectively will prevent any raiding of working channels for any other purpose.

As usual in our American system of free enterprise, the industry leads the way in recognizing the facts of life. Although a thorough study of this very worthwhile text still will not get a student pilot past the almost obsolete requirement to do a low frequency orientation and low approach for his instrument rating, it will be only a matter of time until the slow-turning "wheels" catch up. Therefor, any pilot who is not entirely sure in his own mind that he completely understands the VHF navigation picture, should obtain a copy of "Flying the Omni-range" from Pan-American Navigation Service in North Hollywood, California at its advertised price of \$4.00 and charge it off to inexpensive insurance of easier and safer flying.

Air-Aids Spotlight

ABILENE, Tex.—VOR frequency changed to 115.7 mc.

ALLENTOWN, Pa.—Location designator changed from ABL to ABE for all facilities.

AUSTIN, Minn.—State installing TVOR on airport frequency 108.8 mc, "AUM."

BEDFORD, Mass.—Interference from CHICOPEE LFRRange (Westover) reported at GARDNER intersection when homing on BEDFORD MHW.

BINGHAMTON, N. Y.—Use of DME lowers minimums for twin- and single-engine to 400'-1. mi.

BOISE, Idaho—Frequency swap —BOISE LFRRange now 359 kc, old IDAHO FALLS LFRRange frequency.

BROWNSVILLE, Tex.—VOR frequency now 116.3 mc.

CADILLAC, Mich.—Radio beacon on Blue Airway 3 GRAND RAPIDS to TRAVERSE CITY decommissioned.

COLUMBUS, Ohio—LFRRange final approach course (094° at 2000') bracketed north and south by 1442' and 1550' msl towers.

DALLAS, Tex.—ILS back course straight-in minimums lowered to 400'-1. mi.

DEMING, N. M.—City-installed radio beacon on 248 kc "DMN" 5 mi. west of airport, also operating tower 0700-1900 daily on 201 kc, listening 3023.5 kc.

FT. MYERS, Fla.—Voice radio beacon moved to new location 4 mi. SW of airport.

GETTYSBURG, Pa.—Air Force —installed TVOR on airport, frequency 109.0 mc.

GREAT FALLS, Mont.—Air Route Center added frequency 120.3 mc.

INTERNATIONAL FALLS, Minn.—State installing TVOR at this Canadian border airport, frequency 111.8 mc, identifying "INL."

LUCIN, Utah—New VORW on 115.6 mc. "LCU" commissioned.

MEMPHIS, Tenn.—Frequency swap MEM ILS outer locator now on 287 kc, BRUIN radio beacon on SW course (21 mi.) now 215 kc.

MEXICO CITY—Tower frequencies — approach control 118.3 mc primary VHF; local control 118.1 mc; ground control 121.9 mc; all also transmit 278 kc and listen 122.5 mc,

3023.5 kc. Add ADF beacon on 341 kc "TZ" at TIZAYUCA, 14 mi. NNW (334°) of Mexico City LFRRange.

MILWAUKEE, Wis.—BVOR to resume operation approximately 22 mi. WNW (298°) of MITCHELL Field on new frequency 113.8 mc.

MOBILE, Ala.—ILS missed approach altitude raised to 1600' msl.

MUSKEGON, Mich.—LFRRange due to be shut down.

NEWPORT NEWS, Va.—PATRICK HENRY Airport tower frequency changed from 121.3 mc to 118.7 mc.

NEW YORK—IDLEWILD approach control now 123.9 mc; hi-intensity condenser discharge (sequence flashing) approach lights commissioned along with new centerline system. Air Route Center terminal radar due to begin operation replacing limited MITCHEL facility.

NORFOLK, Va.—Center radar at this site also due commissioning shortly.

RALEIGH, N. C.—ILS localizer frequency now 109.5 mc. Glide path altitude over outer marker now 1565' msl, middle marker 640' msl.

ST. CLOUD, Minn.—State installing TVOR on 111.6 mc, "STC".

TOPEKA, Kan.—Approach control to be moved from PHILIP BILLARD Airport to OLATHE NAS radar to control BILLARD, OLATHE, FORBES AFB and GRAND VIEW AFB, Mo. Local control will remain at respective towers.

TORONTO, Ont.—ILS serving Runway 10 decommissioner. ILS localizer serving Runway 5 now identifying "TX" and LOM now "T".

RICHMOND, Va. — Approach control frequency now 120.1 mc.

UTICA, N. Y.—ILS installation nearing completion.

WINONA, Minn. — State-installed TVOR on 111.4 mc identifying "ONA".

WOODSTOWN, N. J.—VOR due commissioning between WILMINGTON, Del., and MILLVILLE, N. J. to ease crossing airways congestion. New BVOR on 114.3 mc, identifying "OOD".

New ADIZ Zones Call For Changed Section Map Lines

Because the new ADIZ regulations became effective Dec. 1st, and because the authorities never align these boundaries along either natural or established geographical division lines, the inscribing of the new ADIZ boundaries on sectional charts that may not be revised for a half year becomes both urgent and a chore. Therefore, NAVICOM, as before, offers the following service. Although accuracy is not guaranteed, you will find that the chart "entering" and "leaving" coordinates are adequate to meet requirements and facilitate the irksome chore (chart "edges" referred to are latitude and longitude edges not framing edges). Draw heavy lines as follows:

ABERDEEN—From right top edge of chart at 96°55'W (9°E var line) south to bottom of chart at 44°N 97°55'W (Artesian).

ALBUQUERQUE—From center top edge at 104°07'W (Sabino) to W leg TUCUMCARI range at 104°W, then along 104°W longitude to bottom of chart.

BIRMINGHAM—From top center of chart at 86°40'W (STEPPVILLE intersection), southeast across chart to right bottom corner at 84°18'W (North Smithville Aux. Field); also from right top edge at 85°04'W (Rockmart) southeast to 33°30'N 84°50'W (Roscoe), then to lower right edge at 32°37'N (Gaillard).

BOISE—From center top edge at 117°13'W (Vale) to center bottom edge at 117°90'W (almost parallel to IDAHO border).

BUTTE—Entire top edge of chart at 48°N is boundary of NORTHERN ADIZ.

CHATTANOOGA—From upper left edge at 35°25'N (line passes 1 mi N of NAVY MEMPHIS LFR) east southeast to 35°15'N 89°08'W (5 mi S of Whiteville) then east southeast again to 34°55'N 87°50'W (intersects powerline 4 mi southwest of Cloverdale), then southeast to STEPPVILLE Intersection at bottom of chart at 86°40'W. Also from center top edge at 87°15'W (038° from GRAHAM Omni) east southeast 35°45'N 86°30'W (near Rockvale), then southeast (parallel to old KNOXVILLE ADIZ Boundary) to 35°N 85°30'W (Whiteside), then south southeast to bottom of chart at 85°04'W (Rockmart).

DES MOINES—From lower left edge at 40°41'N (line passes thru WEEPING WATER—Brown airport) southeast to left bottom edge at 95°36'W (4 mi south of Falls City).

DUBUQUE—From left top edge at 95°32'W (6 mi SW of Westbrook) south southwest to upper left edge at 43°07'N (passes through Orange City).

DULUTH—From upper left edge at 47°07'N (through White Earth), east southeast to 46°51'N 94°W (Lake Washburn). Here NORTHERN ADIZ line continues eastward across chart to intersect old TRAVERSE CITY ADIZ line at 47°N 90°W. And EASTERN ADIZ easterly edge starts south southwest from 46°51'N 94°W (Lake Washburn) to bottom of chart at 94°29'W (near Flensburg).

ELKO—From center top edge at 117°09'W almost straight down across chart to bottom at 117°05'W.

FARGO—Along entire left top edge of chart to center at 46°N 99°W (corner of Devils Lake), then southeast to 47°10'N 96°17'W (34 mi 037° from FARGO Omni) westerly junction of NORTHERN and EASTERN ADIZ. NORTHERN ADIZ boundary line continues east to right edge at 47°07'N (through White Earth). EASTERN ADIZ line starts southward from this junction to right bottom edge at 97°56'W (through Hankinson).

GRAND CANYON—Across lower left corner of chart from left edge at 36°16'N 114°W (through top of Lake Mead) southeast to bottom edge at 113°32'W (goes through chart sheet cutoff at Colorado R.). Also old ALBUQUERQUE ADIZ boundary line now leaves bottom of chart at 104°50'W (above Howell Mesa) and runs north to corner at NAVAJO MT (unchanged).

JACKSONVILLE—From upper left edge at 31°45'N (near DOLES radio-beacon), south southeast to 30°10'N 83°30'W (5 mi NE of Perry), then southwest off chart and off shore (Gulf of Mexico) at mouth of Fenholloway R. Also, from left top edge of chart at 83°25'W (7 mi W of Abbeville) southeast to 30°50'N 82°20'W (2 mi S of "N" in OKEFENOKEE SWAMP), then east along 30°50'N latitude line to Atlantic Ocean shoreline six miles north of ST. MARYS FM.

KANSAS CITY—From left top edge at 95°36'W (near Falls City), southeast to 39°20'N 95°10'W (13 mi west of Leavenworth), south to 38°23'N 95°08'W (at Greeley), southeast again off bottom edge at 94°45'W (through Hammond).

KLAMATH FALLS—From top to bottom of chart along 121°W longitude line.

LAGRANDE—Center top edge of chart at 117°58'W (18 mi east of Walla Walla) to 45°20'N 118°-

15'W (center east lobe of LA GRANDE bone marker) to left edge of chart at 44°39'W. Also from top edge at 115°39'W parallel to old SEATTLE ADIZ boundary, southwest to 44°45'N 117°15'W (083° 28 mi from BAKER Omni), south to bottom at 117°13'W (near Vale).

LAKE SUPERIOR—From upper left edge at intersection 47°N and 90°W (old MINNEAPOLIS ADIZ line) across chart to intersection with old CANADIA ADIZ at 47°-10'N 85°31'W.

LEWISTON—From CANADIAN BOUNDARY ADIZ line at left top of chart 70°18'W across the 46°N longitude to 69°36'W (northeast of Moosehead Lake) then southeast to 44°19'N 67°53'W intersecting ATLANTIC ADIZ southeast of Bar Harbor.

LINCOLN—From center top edge at 98°W (4 mi east of Elgin) south to 41°30'N 98°W (near Belgrade) then south southeast to bottom of chart at 97°15'W (10 mi southwest of Fairbury).—Also from right top edge at 96°45'W southeast to lower right edge (through WEEPING WATER Brown airport).

LITTLE ROCK—From left top edge across the 36°N latitude to 93°-at 95°15'W (Fort Gibbons Res.) 20°W (near Ponca), then east southeast to 35°40'N 91°15'W (4 mi NNE of Newport), then off upper right edge at 35°25'N (through Kerrville).

LOS ANGELES—Along top edge of chart from 118°48'W to 117°05'W (6 mi south of Sentinel Peak) southeast to 35°31'N 116°22'W (at AVAWATZ PASS) then south southeast 34°30'N 116°W (108°, 48 mi from DAGGETT Omni), then off bottom of chart at 115°38'W (through Dale Lake).

MIAMI—From left top edge at 81°-48'W (through Highland City) southwest off shore Gulf of Mexico to 27°30'N 82°56'W (tangent to lower tip Egmont Key).

MILES CITY—Along entire top edge of chart at 48°N latitude line.

MOBILE—Across top right corner from 32°N 84°18'W (6 mi SW of Americus) to 31°44'W 84°W (near DOLES radio beacon).

MT. SHASTA—From top to bottom along 121°W longitude line.

MT. WHITNEY—From upper left corner at 37°48'N 120°W (through Emory) southeast to left bottom edge of chart at 118°48'W (13 mi ESE of Porterville), then along bottom of chart on 36°N latitude line to 117°05'W (south of Sentinel Peak).—Also from center top edge at 117°W (southwest of TONOPAH),

(Continued on page 52)



Official NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at 1701 K Street, N. W. Suite 204, Washington 6, D.C. Phone: National 8-0804.

NBAA Outlines Accomplishments Of Association in the Past Year

Through the cooperative effort of NBAA's membership during the past year, the Association has considerably developed in stature, stability and strength. Numerous personal contacts and extensive correspondence reveals that our members, realizing that the success of the Association depends on their active interest, have become a working team. The Board of Directors is the policy-making group and the Executive Committee, Standing and Special Committees, are part of its advisory staff. National Headquarters is operational and administrative, maintaining the office of record. But the real backbone of the Association is its working membership. The future cooperation and assistance given to National Headquarters by each member will prove the measuring rod for continued growth and prestige.

NBAA has far more to offer than just another Association. We are truly in a unique position—in fact, we are today the only Association in the position to serve as the real, unprejudiced "Voice Of Business Flying." We are independent, non-subsidized and non-lobbying. The hundreds of major corporations, companies and prominent individuals represented in our membership, cover over seventy-five different types of commercial enterprise.

A few of the major accomplishments of our Association during the past year should be a matter of interest and record. Although much time and effort was devoted to matters that on the surface appear intangible, nevertheless—from a long-range point of view—they were of considerable importance and benefit to all business aircraft owners and operators as well as civil aviation in general.

1. Much attention was given to obtaining still wider recognition and acceptance of

the importance of business flying in the United States and its growing impact on the National economy. Up until several years ago, the CAA, CAB and ACC had little conception of either the extent or potentialities of business aircraft operation. Consequently, little interest was expressed by these Federal agencies regarding the needs and requirements of this important segment of civil aviation. Through extensive contact work, dissemination of press releases, articles in leading aviation publications and other national magazines and newspapers, a better understanding of business flying problems and increasing good-will toward the Association is becoming evident. As examples, articles have appeared in *Business Week*, *Newsweek*, *SKYWAYS*, *American Aviation*, *Aviation Age*, *Air Facts*, the *Wall Street Journal*, *The New York Times*, *Contact*, *Flight*, *Aviation Week*, *Iron Age*, *Management*, *Flying*, *Mechanix Illustrated*, *Chemical Week*, *Planes*, *Chemical and Engineering News*, *Pegasus*, *Chicago Sunday Tribune*, *Washington Evening Star*, *National Aeronautics*, and so on. Through the efforts of National Headquarters with other mass reader publications, an article is scheduled for the January 1956 issue of *Fortune*. *SKYWAYS*, in recognition of our Eighth Annual Meeting and Forum published a SPECIAL NBAA ISSUE in October which contained an outstanding article about business flying and other material of special interest and significance.

2. Through the participation of our Association in numerous meetings and conferences with Federal agencies and private aviation organizations in Washington and around the country, the aims and objectives of NBAA have been strongly presented and our stand on many issues has resulted in our views objectively influencing the formulation of national aviation policy and planning. Key Committees, Boards, Commissions, and other national organizations on which we presently serve and represent the interests of the membership include:

(a) Air Coordinating Committee—Air Traffic Control and Navigation Panel and various Special Working Groups of the Panel. (b) Radio Technical Commission for Aeronautics—Executive Committee and various Special and Administrative Committees. (c) USAF-CAA Civil Aviation Air Defense Advisory Committee. (d) CAA Aviation Development Advisory Committee. (e) Federal Communications Commission—Special Working Groups. (f) Emergency Aviation Council. (g) Conference of National Aviation Organizations. (h) Na-

tional Defense Transportation Committee. (i) Transportation Committee of the Federal Civil Defense Administration and the Office of Defense Mobilization. (j) CAA Airport Review Advisory Committee. (k) ACC-FCC "TALL STRUCTURES" Committee. (l) ACC Airport Use Panel. (m) AIR NAVIGATION DEVELOPMENT BOARD Committee 1, 2 and 3, and so on.

In addition to the above, frequent contacts were made with the Airport Operators Council, Aeronautical Radio, Inc., National Aviation Trades Association, Air Transport Association, National Association of State Aviation Officials, American Association of Airport Executives and others, concerning matters of mutual interest that required prompt cooperation.

Many of the direct benefits of these varied national activities have been reported in the *Air Dispatch*, *Special Bulletins*, and *Special Notices* distributed to the members during the past year. However, NBAA's strong role in supporting the continuation of VOR/DME as the common system of air navigation; unceasing efforts to protect the safety of business flying against the growing hazard of TV and radio towers in excess of 500 feet; firm opposition to the many untenable provisions of the proposed CAR 54-27; continued championing of the need for high density air traffic rules to help reduce the alarming number of "near misses" occurring almost daily in heavily flown air routes, are just a few of the important services conducted in behalf of the membership that bear reiteration.

There are many other indirect benefits to our members that have resulted from National Headquarters activities that are too numerous to mention at this time. Frankly, there has been little "bragging" about accomplishments since we have been well occupied getting things done that would prove advantageous to the growth and development of business flying.

Since NBAA is a non-profit organization, all of the membership dues are expended to operate National Headquarters and to provide the many services that are essential to the membership. Neither the President, National Vice President or any member of the Board of Directors receives compensation or travel expenses for their valuable time and effort in governing the activities of the Association. Their services are possible only through the active interest in our affairs shown by member organizations. To officials of these firms, the Association owes sincere appreciation and recognition for making possible, through the leadership and guidance of their representatives, the present national stature and stability of NBAA.

Now that the Association has gone through its period of early development with the usual growing pains of any comparatively new national organization, there is a continuing need for vigorous efforts to enlarge the membership and the scope of National Headquarters services. By a united membership working as a team in support of the Board of Directors and the National Committees, our Association during the coming year could advance to a position of greater usefulness to business aircraft operators undreamed of by many.

Technical Committee Strives to Supply Business Aircraft Data

One of the most difficult problems confronting the prospective business aircraft owner in recent years has been the lack of accurate, detailed and factual information about the many facets of operating business aircraft. It has been the prime aim and objective of our National Technical Committee not only to make available to members valuable information regarding the safety, economy and efficiency of business-owned aircraft but also to those organizations that are carefully considering the purchase of an airplane. The facts and figures on business aircraft use, valuable safety information, reprints of articles concerning the operations of a number of members, and other helpful educational material distributed by National Headquarters, has done much to relieve the growing demand for authentic data.

Within our own Association, membership management and operating personnel are constantly seeking methods of improving their aircraft operations. They recognize the need for better operating procedures to maintain effective organization and control; to develop greater safety; to conform with all legal requirements; to keep operational costs in line; to fulfill traffic schedules; and to improve their aircraft services to the fullest possible extent. Through free interchange of information regarding mutual problems, considerable benefits have been derived by our members. The National Technical Evaluation Committee will continue to study all aspects of business aircraft operations and make their findings available to the membership through National Headquarters.

New Members

Capitol Airways, Inc.

Berry Field, Nashville, Tennessee.

NBAA Representative: George C. Prill, Vice President of Maintenance and Engineering.

Nature of business: Independent Airline and Fixed Base Operator.

Capitol has available for charter and contract flying, 70 pilots in regular operation for their 12 C-46's, 3 DC-3's, their DC-4, Twin Bonanza and Bonanza equipment.

They have owned and operated aircraft as adjunct to business since 1946.

Continental Can Company, Inc. (Air Transport Department).
Morristown, New Jersey.

NBAA Representative: Steve L. Brown, Commercial license, Chief Pilot.

Nature of business: Executive aircraft operation.

Continental has owned and operated aircraft as adjunct to business since 1939 exclusive of World War II. They operate 3 Lockheed Lodestars, one B-24 Liberator and one Martin B-26 Marauder.

Big Three Welding Equipment Co.

Houston, Texas.

NBAA Representative: James E. Brewer, Chief Pilot, Commercial license.

Nature of business: Welding equipment sales.

Owned and operated aircraft as adjunct to business since May, 1955.

Company operates a Douglas DC-3-A (N-38F).

Scott Paper Company.

Chester, Pennsylvania.

NBAA Representative: Wells Forbes, Chief Pilot, ATR.

Nature of business: Paper manufacturing. Owned and operated aircraft as adjunct to business since February, 1955.

Company operates a Douglas DC-3.

Capital TACAN Meeting Fails To Elucidate Military's Role

ANDB's TACAN Symposium, recently conducted in Washington, was well attended. However, many persons were disappointed that the "uncertainties" of the military tactical system were not cleared up so that a better understanding of its capabilities and deficiencies could be obtained. Most of the discussions were highly technical and various points were withheld because of the security nature of the information. The merry-go-round still goes round and round!

Often mentioned during the meeting were the possibilities of channel interference between TACAN and the radar beacon. Air-to-ground TACAN channels are supposed to be located in the 1030mc and 1090mc band and the beacons operate in the same range. The Airborne Instruments Laboratory and the National Bureau of Standards are presently studying channel coverage requirements but their reports may not be available for a month or more.

Two of the final conclusions drawn by influential observers at the Symposium were: (1) TACAN could not be fully implemented to the current status of VOR/DME for some eight or nine years, (2) Based on present airways aids and control systems now being developed, TACAN may never be adopted for civilian use.

Future reports will keep you posted on the TACAN issue.

NBAA Feels ACC's Tall Towers Report to Aid Hazard Problem

When the final report of the ACC Joint Industry-Government Tall Structures Committee is released, it will be found to be a highly beneficial answer to the serious hazards created by TV and radio towers exceeding 500 feet. NBAA has been a most active participant on this committee, composed of representatives from the TV and Radio Industry, CAA, CAB, FCC, Military, and national aviation associations.

Details of the report cannot be released at present, but it can be said that the ACC Air Space Panel will review and require justification for all applications submitted to the FCC requesting towers exceeding 500 feet; that "farm" areas are planned for grouping of towers; that multiple antenna transmitting towers are necessary to compromise the conflict of interest between the broadcast and aviation industries.

The mutual agreements finally reached between the committee members will prove vitally significant in reducing the unwarranted hazards to air navigation now imposed by tall structures adjacent to airports and along airway routes. A later report will carry the important recommendations contained in the JIGTSC Report.

ACC NAV Panel Reviews CAA's Five-Year Federal Airway Plan

The ACC NAV Panel, of which NBAA is a member, recently reviewed the CAA Federal Airway 5-Year Plan for air navigation and traffic control and compared it with the applicable major concepts of the SWG-13 Report on the common system of air navigation and air traffic control.

The CAA Plan presents a 5-Year Program for establishment of airway facilities and services and the operation and maintenance of the Federal Airway System. As such, of course, it does not include funds for the development of new devices. Provision for this necessary development must be included in other budget segments.

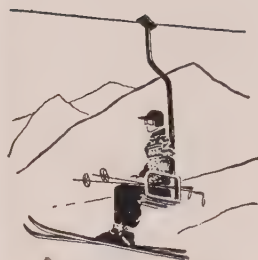
The Federal Airway System has not been able to keep pace with the increasing demands due principally to budgetary limitations. The Panel feels that the CAA 5-Year Plan will provide system improvements which, if implemented, will reduce the lag in meeting the demands. The successful application of these improvements depends largely on the concurrent implementation of ground and airborne equipments. The Plan is designed to provide system improvements which will permit more efficient handling of military tactical, as well as civil and non-tactical military operations. The program has been spread over the 5-year period for fiscal and operational reasons. However, the progress in 1957, as indicated in the Plan, NBAA believes is totally inadequate. The 1957 budgetary level should be increased to the maximum which is within the capabilities of the CAA to administer (approximately \$50,000,000).

As a member of ACC SWG-13, NBAA concurs that the plan is generally consistent with the concepts of SWG-13 report with respect to the expanded use of all appropriate types of radar, civil and military, and proposes improved radar equipment for coverage in areas where military radar does not exist or is not adequate for air traffic control. Anticipated minimum communications requirements will be substantially met by the expansion of direct pilot-controller communications and by providing for coverage identical with air traffic control radar coverage. Anticipated developments in the field of air traffic control coordinating equipment are taken into account by the plan. The plan also provides for the control of aircraft operating under instrument flight rules in all airspace above 24,000 feet as soon as adequate communications are available. The application of control to both IFR and VFR aircraft in all airspace will begin at the higher altitudes only, with the floor lowered as equipment development and experience dictate. This latter phase cannot begin without seriously impeding existing traffic flow until adequate radar capability is available.

The plan further proposes expansion of a Common System line-of-sight rho/theta short distance navigation network without prejudice to the particular system employed. However, due to the lack of a decision in the VOR/DME-TACAN study, the plan does not provide for additional DME in FY 1957. NBAA strongly objects to this deletion.

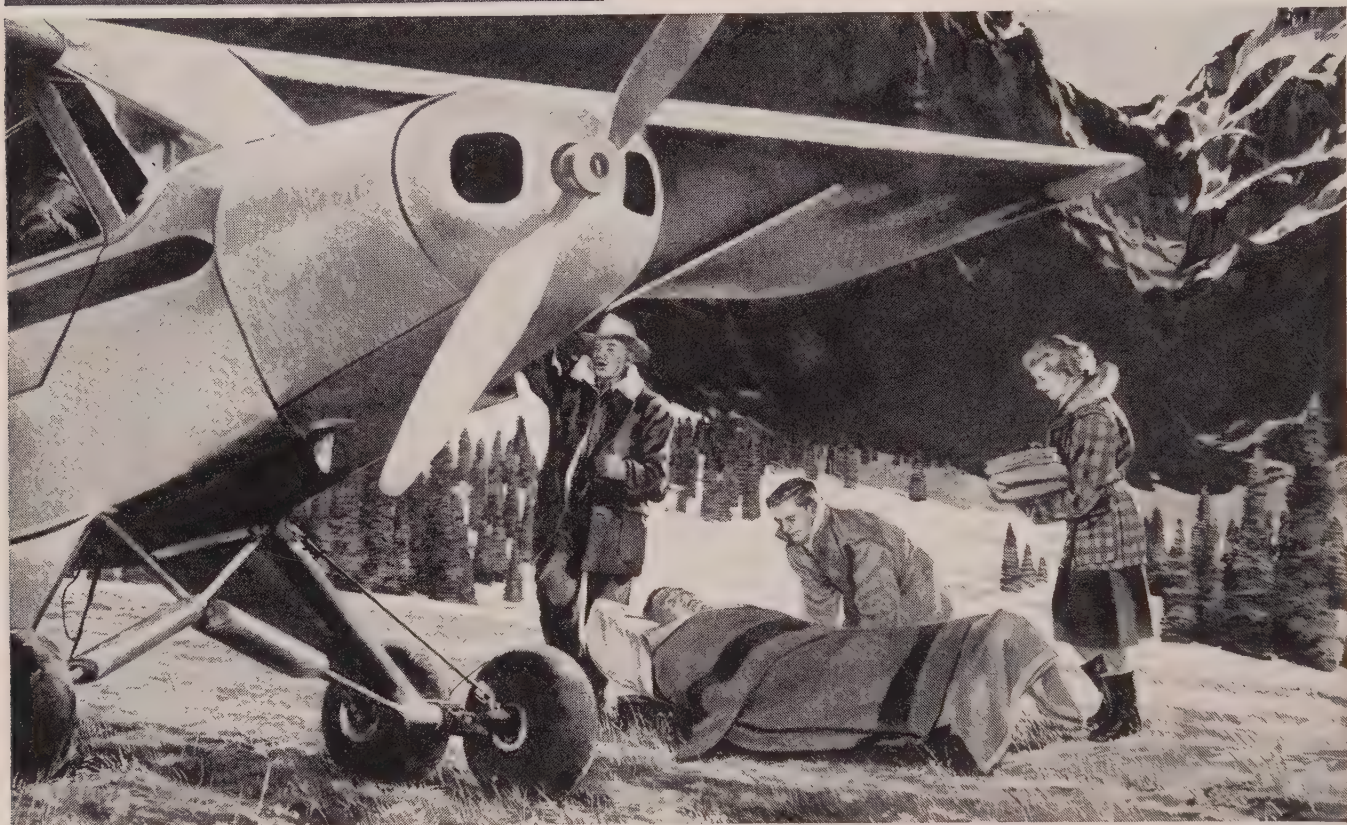
(Continued on page 50)

PLANE FAX



Your Best Week-end Flight Plan for February

Fly to a week-end of colorful winter sports February 11-12, when Reno's annual Snow Carnival takes place. Plan to land at Reno Municipal Airport or the Reno Sky Ranch for quality Standard aviation products and service.



Flying rescues—one mile down in Hell's Canyon

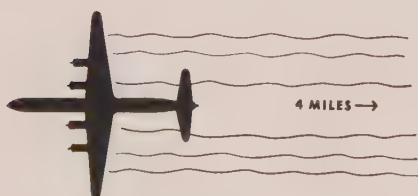
"Roughest terrain in the country"—that's what most pilots call the 5500-foot-deep Hell's Canyon of the Snake River. But every winter George Foster of Grangeville, Idaho, makes several emergency flights to isolated ranches inside the canyon's narrow gorges and flies accident victims out to hospitals for medical aid.

"The land is all straight up and down, inside the canyon rim," says Mr. Foster. "Flying between thousand-foot cliffs calls for plenty of attention, and for lots of power when I need it, too. But I always get the extra power I have to have,

with Chevron Aviation Gasoline 80/87 in my Super Cub. Chevron 80/87 never fouls spark plugs for me; delivers smooth, dependable performance. I can lean it down for economy in level flight, too.

"Because nearly all of my flying is over wilderness, I can't risk any engine trouble. However, I've had such complete success with RPM Aviation Oil that I don't even need top overhauls between majors. Rings and valves stay in perfect condition right up to the last hour in the air. I'll never use any oil but 'RPM' in any plane I own."

T. M.'S. "RPM," "CHEVRON," "PLANE FAX," REG. U.S. PAT. OFF.



TIP OF THE MONTH

It's wise to stay away from the backwash of large aircraft of any kind; extreme turbulence often exists more than 4 miles in their wake.



STANDARD OIL COMPANY OF CALIFORNIA

FUELS-OILS

Features and Facts Pertinent to Successful Flight Operations

New Portable Filters

Remove Water From Fuel

Water suspended in fuel always has been a problem of sorts in aviation. In the upcoming jet fuel picture, though, it has loomed as a possibly major one. Jet type fuels, and particularly kerosene, seem to soak up and hang onto water like sponges.

A major filter company, however, now claims to have licked the problem, all down the field, for avgas, or any of the jet-type fuels.

The company is Purolator Products of Rahway, N. J. They have built, a spokesman has announced, portable separator-filter units that will remove 100% of the water from aviation fuels. The filters were designed for the Navy but the company already has realized the commercial future of the device and has built a commercial version. The models are not on a production schedule and all, at least now, are available only on a to-order basis.

The commercial version of the filter unit is designed to be mounted horizontally in the rear bucket box compartment of refuelers or on carts. Stands also are available for stationary installations.

Key to the filter's 100% claimed efficiency in removing water is a double-stage set-up of filter elements. The commercial version has 14 coalescer elements placed horizontally and 22 final-stage elements placed vertically.

The final stage elements are the real fine screens of this mechanical water separation system and consist of a rosin impregnated cellulose material resembling paper.

While removing all of the water, in any type of aviation fuel, the new filter is said to also take out 99% of all solids, right down to microscopic particles of five microns in size.

Because of the Navy specifications that sparked the development of this filter, all of the models produced so far can handle the filtration job at the very high rate of 300 gallons per minute for avgas, and 225 gpm for the JP fuels and kerosene.

A company spokesman indicates that for commercial users that would not require that rate of flow, particularly for truck mounting, revisions possibly can be made that could result in size and weight savings.

One market that already is obvious for the new filter is the expanding jet circuits of BOAC.

In view of the continually enlarging turbine picture, Purolator's efforts in putting out the new filter at this time hardly seem wasted.

Manual Checking Forms

Best Bar to Water

Despite advances in filtration systems (see "New Portable Filters"), many air-

craft owners and operators in the business and private fleet will continue to depend most of all upon personal responsibility and caution to guard against the contamination of fuel by water.

Because this is a vital link, but still one that normally may be not thought of too much, SKYWAYS presents here a timely reminder of good fuel checking procedures as drafted by the Aviation Technical Service Committee of the American Petroleum Institute.

There is no substitute for the manual checking of the water content of storage tanks and fueling tanks with litmus paper or water detecting paste.

When equipment is used to prevent the passage of water slugs, it should be realized that all mechanical devices are subject to failure. Their use therefore, should be considered as a secondary precaution which may, or may not, be effective in the event of human negligence.

Check Tanks

During normal weather, storage tanks should be checked daily with water-detecting paper or water-test paste, and after the receipt of each load of fuel. If possible, the fuel should be allowed to settle for a period of one hour prior to checking for water. This will insure a more accurate test than would be possible immediately after the receipt of fuel.

During periods of heavy rain, melting snow, or high ground-water level, underground tanks should be checked more frequently. Water may be removed from underground tanks by a small rotary or piston type "thief pump."

Above ground tanks should be provided with a water draw-off valve in the bottom of the tank. Because above-ground storage tanks are subjected to considerably greater variations in temperature than underground tanks, condensation will naturally take place at correspondingly greater rates.

Tanks which test consistently water-free are not normal.

In such instances it is quite possible that the suction pipe terminates too close to the bottom of the tank, and as fast as water accumulates it is drawn off with the fuel.

Normally, most of the entrapped water will settle out of aviation gasoline if allowed to remain unagitated for a period of 24 hours. When tankage is not of sufficient capacity to permit such unagitated storage, it is desirable that the manifolding be so arranged as to permit settling of the fuel prior to use. After settling, the tank should again be checked for water before it is placed in service.

The suction lines of all underground storage tanks should be equipped with water-locking foot valves, floating suction, discharge shut-off valves, electronic probes, or other devices designed to prevent solid water from entering the suction stub should the water suddenly build up to dangerous levels, as might occur due to seepage through a broken fill line.

Fill caps on underground storage tanks should be of a waterproof type and terminate in a suitable fill-pipe cover box. This box should be protected by a concrete pad, curb, or other device designed to prevent damage to it or to the fill line below.

When practical, the fill boxes should be raised at least 12 inches above the ground. Where tanks are installed below traffic surfaces (either automotive or aircraft), the fill boxes should be installed flush with the surface, and the paving near the fill box should be designed to slope away from the box in order to provide adequate drain-off of surface water. Tank fill and gas-line caps should be kept clean and tightly closed at all times. Gaskets should be renewed when necessary.

Pit Filling

When fueling is by fixed facilities—pits, hydrants, or cabinets—and when storage is of insufficient capacity to permit settling of the fuel prior to use, coalescing tanks are desirable for the removal of entrained water. Coalescers are tanks packed with Fiberglas or a cellulose material, wherein finely divided water particles are joined with other particles, creating large globules. These settle into a water leg or sump where they can be withdrawn.

In certain instances, consideration also should be given to the use of an automatic shut-off valve in connection with coalescing tanks. This valve is actuated by the water level in the sump or water leg of the coalescing tank, and it will automatically shut off the fuel-discharge line should water rise to a dangerous level within the sump or should a slug of water be drawn from the storage tanks.

Truck Filling

When fueling aircraft by trucks, and when neither the storage nor the tank trucks afford sufficient settling time for the separation of entrained water, coalescing tanks may be used on the truck loading rack.

The water sumps of fueling trucks should be checked for water *each* morning after *each* filling and at *each* crew shift. This should be done by the use of litmus paper or water-detecting paste or by the withdrawal and examination of at least one gallon of the fuel from the sump. Sumps always should be drained into a glass container to permit a careful examination.

Last Check

As a final check after each fueling, a sample of fuel should be drained from each tank sump in the airplane or at the lowest point in the fuel system where a drain valve is provided for this purpose.

This fuel should be drained into a glass container and carefully examined for water and dirt.

Attention is called to the fact that it is frequently difficult, especially at night, to determine whether the sample is composed of all water or all gasoline. An inch of gasoline placed in the bottom of the container before draining will permit easy detection of an all-water sample.

Ground Equipment Problems Licked by 'Cooking' Gas

While the equipment that lands and takes off at airports has been getting slicker every day, the equipment that handles the aircraft on the ground has largely remained unchanged. Many a brand new multi-hundred-thousand dollar executive craft has been towed by a tug that basically has not been modified in years.

One of the most interesting attempts to modernize ground equipment (tugs and energizers in this case) seems to have scored a solid success at the Delta Airlines operation at Atlanta Airport.

Economy and efficiency minded maintenance superintendents everywhere may have an important lesson to learn from the Delta conversion.

The two main problems that Delta set out to solve were the standing one of economy and the special one of sparkplug fouling which, particularly with constant RPM engines, can be a headache. If they could, to boot, get longer life out of the equipment that would be okay, too.

As it turned out, Delta rang up a plus on every count.

The Delta solution involved converting its tugs and energizers so that their engines would burn Liquefied Petroleum Gas (LP-Gas) rather than regular gasoline.

The LP-Gas they had in mind was the same sort of fuel that is used by the millions of gallons in suburban and rural communities to operate stoves as well as farm equipment.

One concern that shadowed the idea of the conversion was that an LP-Gas system for the tugs and fuels would be a pressure system, building up as much as 150 pounds pressure on a hot day. On the comforting side was the knowledge that Pacific Coast truckers have been using LP-Gas with signal success.

To see what could be done, the line's maintenance people and the principal LP-Gas supplier in the area, General Gas Corp. of Baton Rouge, went into a huddle and set up some operating tests.

The results are now visible at Atlanta Airport where 10 Delta tugs and energizers have been converted to LP-Gas and 10 more are going to be.

The results also are visible on Delta maintenance sheets.

First of all, it costs only \$150 per unit to make the conversion. But, the saving in fuel alone amounts to some nine cents per gallon.

On top of that the units use less fuel.

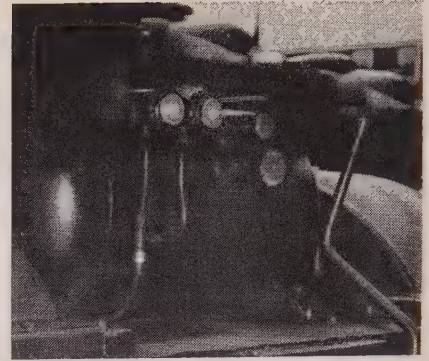
By the end of a year's operation, the company figures each unit will have resulted in an over-all saving of \$319.98 in fuel alone.

Lubrication also will be simplified by the new fuel system, the company says. Oil, henceforth, will be changed only twice a year and oil savings for each unit should amount to \$5.28 a year.

When it comes to sparkplugs, the company expects a major improvement. The life of the plugs, using the new fuel, has not even been set. "Indefinite," is the way their expected life is described now by H. A. Petty, assistant to Delta's maintenance superintendent and a key figure in the imaginative conversion plan.

The LP-Gas, which is a liquefied condensate from natural gas or from the casing-head gas of oil wells, is used without any additives at all, burns clean, and has a 100 octane rating with which to better operate the ground equipment engines.

The main components of the conversion are relatively simple: new tanks, a revised carburetor, a pressure regulator and vaporizer (the real key) and filters. Under ideal conditions, one man, the company estimates, can do the whole job on one unit in four hours.



SPECIAL LP-GAS tank is shown here mounted under the driver's seat at back of tug

The installation of the tank presented no problem of placement.

The main difference in the carburetor is in its jets which are given openings of about $\frac{5}{16}$ ths inch inasmuch as they meter no liquid fuel at all but always handle vapor.

The pressure regulator and vaporizer is the heart of the system. Its simple installation is shown also in the accompanying photo.

The unit is mounted on the block adjacent to the carburetor which, in the picture, is hidden behind the round pressure regulator-vaporizer.

The accordion-pleated hose leads to the carburetor and always operates at zero pressure because of the regulator unit which, in a way, is quite similar to the regulator in a demand oxygen set-up.

Inside the regulator-vaporizer unit, there is a heating coil through which engine coolant passes to provide heat for the vaporizing process. The normal operating temperature is 160° F. There is, however, enough vapor in the system even in cold weather, to get things started.

Rather than being a concern, as it once was thought possible, the fact that the fuel is in a pressure system, is now considered a potentially important safety factor. In case of fire, the tendency of the flames would be to blow away from the tank, producing torching outside rather than backing up into the fuel supply itself.

In selecting equipment for the pressure-vaporizing unit, Delta chose that of the Ensign Co., of Huntington Park, Calif.

Zenith Carburetor Division of Bendix, in Detroit, makes similar equipment.

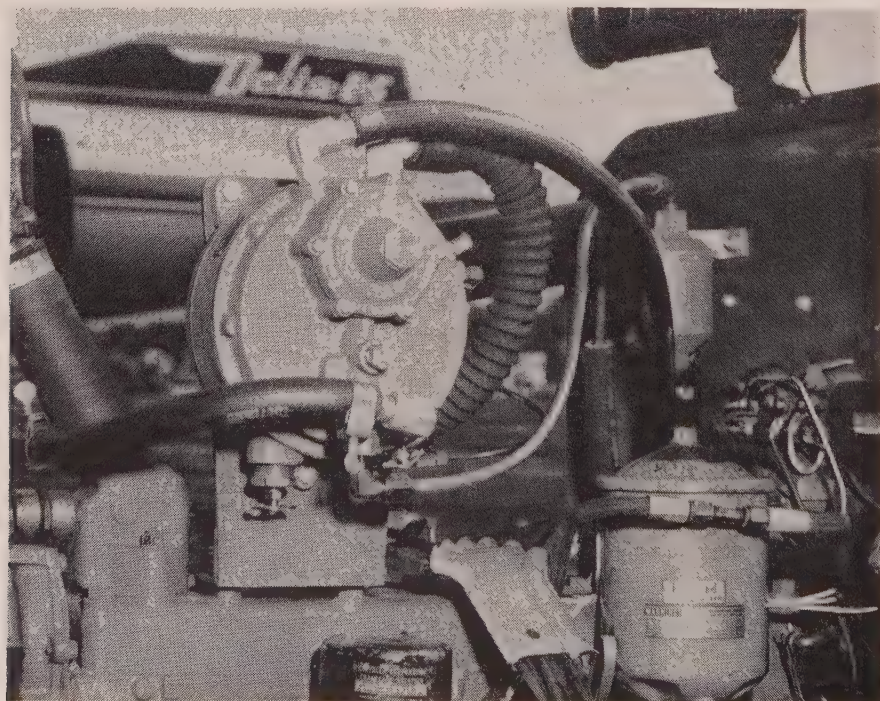
The final choice at Delta was made on the basis of the Ensign being a completely manual rather than electrical system. Delta felt that this would be better for the relatively inexperienced personnel that might have to use some of the equipment.

Other stations along the Delta system will be converted to LP-Gas ground equipment in the future. Miami may be the next.

One problem that still hasn't been altogether solved is far from technical. In some locations, city ordinances may impose strict limits on the use of LP-Gas.

At Chicago Airport, for instance, LP-Gas storage would have to be in the center of a vacant, four-acre plot. And, of course, no such site would be available. Most cities, though, have reached the conclusion that Delta has; that LP-Gas is safe enough for normal handling and storage.

DELTA AIR LINES estimates that by converting engines of its fleet of tugs and energizers to use LP-Gas it saves nearly \$320 a year for each of these 26 airport vehicles



Science Boosts

(Continued from page 15)

contract in the history of the flight-control industry.

Back of these technical successes and the many similar programs that are security classified but even more glamorous, is a consistent record of sponsorship of utility and safety in business flying. Much has been contributed to the transition of private flying from the category of sport and avocation to that of an everyday business necessity, and this has been topped off with their offering of the five-miles-per-minute *Learstar* executive transport to fill a current gap in long-range flight equipment.

For nearly a quarter century the firm has been supplying radios to private and business-airplane owners. Perhaps one statistic from the company's current sales record will indicate that they are considered among the best: so far in 1955, a single lightplane builder has placed orders for more than \$1,000,000 worth of Lear radio equipment!

Lear also has been one of the largest suppliers of Automatic Director Finders or radio compasses in the private field, and is the only company to design and produce autopilots specifically for this field. Also available for business aircraft are stability augmentation devices like the ARCON automatic rudder control, and other products of the same family now being readied for production. The *Learstar* transport, converted from the Lockheed *Lodestar*, is the only aircraft in its class that has been certificated by the CAA in the airline category.

In the field of simplified data presentation for the private airplane, the company has announced the NAFLI instrument which, by showing the exact attitude changes of the aircraft itself instead of a moving artificial horizon, speeds up pilot training and makes accurate heading changes a natural pilot reaction instead of a hard-won art.

In light of the foregoing, no close figuring is needed to justify regular use of six to 10 business aircraft by Lear in conducting the firm's far-flung activities. There just isn't any other way their distribution and service job could be done, nor any other efficient means of accomplishing their interplant liaison.

To begin with, Lear's four main regional experts for private airplane equipment sales and service, headquartered at Teterboro, N. J., Grand Rapids, Michigan, Wichita, Kansas, and Santa Monica, California are under strict orders to visit more than 100 distributors at least once per month, and submit written reports and comments on progress, problems and proposed improvements.

That means that an average of 25 distributors look to each regional manager for close personal assistance and inspiration, with many such distributors located on airports not serviced by airlines. The time element alone eliminates consideration of any kind of transportation except air. Yet by business airplane, constant close contact is possible and a human link with the factory easily is placed on the distributor's doorstep—bringing new sales

literature, a fresh picture of what all of the other distributors are doing to boost the product line, and aiding in local promotional work.

The fact that each of these airplanes carries full Lear equipment for demonstration purposes is only incidental. The same could be true of any other product line that a nationwide organization needs to have on the spot for proper liaison in the field.

Airplanes used for this regional work include a single-engine Beech *Bonanza*, a Piper *Tri-Pacer*, a Cessna 180 and an *Aero Commander*. They accomplish intensive coverage in these big regions, almost regardless of weather. The total hours average out to nearly 70 per month per

airplane, or over 800 hours per year. Utilization would be even higher if two round-trip distributor visits were made per month, but that is not as effective, the company finds, as a single round trip leaving the top man free for numerous special or emergency calls, such as those that arise when a given distributor needs continued assistance in a sales campaign, or extra assistance from the factory.

Each regional representative is himself a pilot rated for instrument flying. In fact there is a company rule that no company pilot shall fly any airplane with retractable gear unless he has an instrument rating. This is perhaps as good a place to draw the line as anywhere, Lear believes, considering the fine performance operators

Royal AMPHIBIAN NEWS



Notes on America's outstanding utility amphibian for business flying and charter service operation

THIS "GULL" WAS STANDING STILL 35 SECONDS BEFORE PHOTO WAS TAKEN



Yes, 35 seconds before this dramatic picture was taken, this standard Royal Gull amphibian was at a complete stop. This scene is on the famous Horsetooth Reservoir, Fort Collins, Colorado, about 60 miles north of Denver. The reservoir's altitude is 5400 feet.

It was on July 18, 1955, at 11:30 a.m., and the outside air temperature was 79° F. We were fully "grossed out" (6000 lbs.). The wind was from the north at 5 miles per hour. Royal Aircraft's test pilot, Wally Watson, applied forward

pressure to the throttles and with a manifold pressure of 22.0 at 3400 rpm, America's only new twin-engine amphibian was soaring gracefully in the warm Colorado air after a take-off run of only 35 seconds.

A number of other high-altitude take-off tests were also run at a 6780-ft elevation in Rawlins, Wyoming. At 5780 lbs. gross weight, take-off time was 19 seconds from paved surface . . . 38 seconds from the waters of Seminole Reservoir.



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are getting out of "lightplanes" these days.

Other company airplanes—a *Bonanza*, a *Dove*, a *Cessna 310*, and a *Learstar*—are used extensively to flight test developmental equipment, or to demonstrate it. This kind of work is in charge of William W. Vogel, head of Sales Engineering and Flight Test for the company's LearCal Division, Santa Monica.

Each of the regional men, as well as Mr. Vogel, carries corporate executives around the country in tying together the widely separated activities of the four manufacturing divisions.

This is especially important in providing technical liaison for manufacturing and development work underway on an inter-divisional basis. Sometimes the only alternative to the ready availability of air transportation would be an investment of millions in duplicate equipment, and the company feels that in these days, at least, there is as much reason to secure maximum utilization of top technical talent as in any other executive category.

In today's intensely competitive climate, the company maintains, every critical decision should be made by the best talent available, and with proper use of business aircraft the best talent is always available wherever the facts, the facilities or the other people concerned are to be found, or wherever a troublesome problem may arise.

In addition to the above business aircraft, the company normally has on bailment from the military services one or more of each of the military types for which Lear is developing advanced equipment.

Also, essential interplant liaison is carried on by the corporate director of advertising and public relations, Norman Warren, in his fully instrumented personal airplane.

All Lear executives, and Bill Lear in particular, are enthusiastic about the outlook for business aircraft growth in the decade ahead. Bill has gone so far as to predict 100,000 airplanes in business use in 1965, calling today's rapid upsurge just the beginning of belated recognition of the true dollar-and time-saving efficiency of business flying.

Naturally, his estimates include foreign markets, and that his interest there is quite practical is indicated by the fact that when another NBAA member, Beech Aircraft Corporation, recently demonstrated the French twin-jet four-place Morane-Salnier aircraft in this country, it was found to be "loaded" with Lear equipment built in France by Societe Generale D'Equipments (SGE). Similarly, the French transport design, the *Caravelle*, built by Nationale de Constructions Aeronautique due Sud-East (SNCASE), is equipped with a Lear L-5 autopilot and many other Lear products. Down in Italy, the Fiat company is turning out North American F-86K fighters for European defense, equipped with the complete Lear F-5 autopilot. Lear says that security classified applications of Lear systems to the most advanced aircraft of other European countries may soon be revealed, and selected Lear engineers have had to learn a number of foreign languages to handle the liaison involved. In this connection, it is interesting to note that Mr. Lear, in an October, 1955, speech

before the annual meeting of the Wissenschaftliches Gesellschaft fur Luftfahrt at Augsburg, Germany, gave German scientists credit for having originated aircraft body axis rate stabilization, force steering, and the remote indicating vertical gyro, all of which techniques have since been carried forward by his company in the United States.

To give me an idea of the number and complexity of active research and development projects that are continuously in process at Lear, the company showed me one of their current laboratory schedules. It personally meant little whether they had 5 or 500 projects (as a matter of fact there were about 100 separately budgeted), but it did seem most significant that of this total, more than a third were being financed out of company funds! Moreover, many of them were along unfamiliar lines.

Dr. C. J. Breitwieser, Vice President-Engineering, explained the company's attitude regarding publicity about its research programs:

"The time to announce spectacular achievements is after hardware is bought," he said. "Useful application is the pay-off and sole criterion of all of the skills involved, including management. It usually becomes clear enough then that the development has been underway for perhaps years; that it has been conducted by men of the highest professional skills, with tools and laboratory equipment correspondingly advanced, and all in the proper environment, backed where necessary by ample company funds.

"For example," Dr. Breitwieser continued, "Lear's pioneering in remotely controlled vertical gyro instruments began in the '40's. We were the first in this country to take the attitude gyro out of the crowded space behind the instrument panel and put it back in the fuselage, able to repeat its data to any point it is needed. Within the last year, Lear remote VGI's have pretty much taken over the entire high-performance market. Our VGI, with either a conventional display or our novel two-tone pictorial-type display, will be found on virtually all of tomorrow's top interceptors."

Dr. Breitwieser's allusions to world scientific frontiers are fascinating but hard-ware productivity has its practical place in the financial picture of the Lear organization. In 1948, the company's gross sales amounted to \$5,326,689, and in 1954 they were \$52,289,665. At mid-1955 sales were running substantially ahead of the previous year, and backlog had risen to \$46,000,000.

Certainly the above figures would not have been possible without the extensive use of business aircraft in coordinating the world-wide engineering, sales and distribution activities of this most progressive organization.



Round Table

(Continued from page 18)

and navigate by instrument for at least reasonable distances.

"That is being proposed by CAA for this new CAR 47 and would be a mandatory requirement for air taxi operation.

"I'd like to show you an example of questionable operations and equipment. A

very prominent and supposedly successful air taxi operator was called upon by five businessmen to fly them a distance of some 200 miles. Apparently, this air taxi operator was short of commercial pilots and he hired another one to take the Twin Beech to this particular airport to pick up the five men. This the pilot did, but on getting back into the destination airport, he couldn't seem to figure out which way to land on the airport. As a result, the airplane got away from him, ground-looped and rolled a tire off. To make matters worse, the seats weren't anchored properly and they all came loose and jarred the five men but good!

"Two of the five men were pilots and they reported the incident to their Congressmen. They got action right away. This is an indication that we are becoming more enforcement conscious.

"Frankly, gentlemen, we feel the air taxi industry must stand up and act like a major segment of aviation. We would like to see air taxi operations recognized on their own merits. Operators should have suitable equipment and competent personnel so that when a businessman or anyone else wishes to use air taxi operations, he should be sure he is going through and that it will be a safe, and smooth and businesslike operation.

Speaking of safety, if you do use or plan to use rotating beacons in night operations, don't run into the deal Thorne did in California. It was his first time flying two rotating beacons in a cloud at night. They create quite a distracting glare under these conditions. It looks like that is what caused his initial loss of flight control."

Richard Washburn (Pres., Nat'l Air Taxi Conference & Pres., Southern Flight Air Taxi, Inc.): "That experience in the Midwest that you referred to, was he a member of the Air Taxi Conference?"

Ken Aldrich: "I don't know whether he was or not. I do know he was a certified air taxi operator, but in this case he was using a multi-engine airplane on an air taxi operators' certificate which authorized single-engine only. He is quite a prominent operator. I might add that arrangements can be made to supply your conference and other interested parties with CAA's investigative findings and enforcement actions."

Dick Washburn: "Naturally, we of the ATC would very much like to know of instances such as that. We have the job of maintaining the standards of the Conference, and we don't want to get black eyes. Thus far, we haven't had any along that line."

Ken Aldrich: "Let me say this, as a result of the Thorne accident in California, the CAA is stressing its enforcement program. The riding, non-riding public as well as the industry itself is stressing the need for this. We intend to do as much as we can within our limited resources.

"As a result of this California incident, action is underway in Washington now to arrange a closer liaison between the tower people and the aviation safety people who are not only charged with certification but also are charged with investigation and surveillance for enforcement purposes. I think you'll find that there is going to be a stepped-up policy, and it will be for the good of everyone concerned.



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INDIANA TECHNICAL COLLEGE

Round Table

(Continued from page 42)

Dick Washburn: "The standards of the Air Taxi Conference normally are higher than those required by the CAA or the average air taxi operator who is not a member of the Conference. As far as I know we have not had any complaints from passengers."

Ken Aldrich: "That's fine. But as Sam mentioned earlier, there are 107 in the Air Taxi Conference, but we have a record of over 1,000 air taxi operators. Remember, the public as a whole may get a very bad taste from a person or operator who is not a member of the conference. He can reflect on the Conference. That's why we hope this CAR 47 will help strengthen the hand of everybody and provide means for closer liaison."

Sam Freeman: *I'm glad to hear you say that we can tie in a little closer with you people. We often can't enforce our own requirements because we haven't the people to check on things for us. Therefore, we have to count on the CAA to do it for us, at least to some extent. If we can develop a little closer liaison, it will be all to the better.*

"Mr. Glennan, would you care to make any comments regarding your experience in the Idlewild area on control of mixed traffic?"

F. G. Glennan (Chief Controller, N.Y. International Airport): "On the whole we are very happy with your operations. I can only speak firsthand about Red Bank because you other fellows don't come in quite as often."

"Perhaps the most important thing, as far as our recommendations are concerned, is that those who are flying air taxi planes should familiarize themselves with the area they are flying into and be familiar with the instrument approach channels to the airports. They should plan their entry into the control zone so as not to interfere with other approaches that may be going on at the same time."

"Speed differential is important sometimes. Once in awhile we have to revise the sequence of the air taxi coming in because he has been overtaken by someone else. It's a lot easier for the air taxi to maneuver and to follow the air carrier than the other way around."

"It isn't necessary for the smaller planes to fly as big a pattern as the air carriers do. We have 5,000 acres at Idlewild and if the air taxi stays within the boundaries of the airport, we'd be mighty happy because we can get them on the ground and out of the way quickly."

"Weather conditions permitting, the air taxi can use another runway, one entirely divorced from other operations, to get them off the ground and on their way."

"Quite a few times we'll get a request from an air taxi operator asking us to notify an air carrier about an arrival or a departure of a passenger. We'd be only too happy to comply with some of these requests if we had the time, but we haven't. Our frequencies are saturated now because of the increased volume of air traffic."

Sam Freeman: *"What would be your feeling about having a parallel runway for use by the air taxis?"*

Frank Glennan: "We are all for parallel runways. If they are provided we will make good use of them."

Sam Freeman: *"What about authorizing the use of taxi strips for landing under certain conditions, weather and wind, etc?"*

Frank Glennan: "No taxi strips. We won't buy that. As you know a preferential landing system has been set up in the metropolitan area by the NATCC. At Idlewild landing to the northwest of Runway 31 left is the preferential runway. However that does not preclude an air taxi aircraft who can fly within the boundaries of the airport using 31 Right which we like to give him to get him on the ground and into the gate. Some of the air carriers don't understand why we can't give them 31 Right. We can't because they would have to go out over populated areas to make their approach. But we can accommodate air taxi aircraft which make their pattern within the boundary of the airport."

Sam Freeman: *"Capt. Waters, I believe you have a flight to make very soon and will have to leave us. Before you go, however, would you tell us what if any problems you have run into with regard to air taxi operations?"*

Capt. Wm. R. Waters (Pilot, Northeast Airlines): "On the whole, my experience has been excellent. We have had some recorded instances of air taxi interference, however. On one occasion I was bound for LaGuardia from New Rochelle and there was an air taxi mightily close to me. I don't know why he wasn't spotted by radar, but he wasn't. I don't even know where he was coming from, LaGuardia was reporting a half-mile and everybody was IFR except the air taxi. We both crossed the station at the same time—I was at 810 feet and he was at 800. An air taxi operator or any small plane pilot has to realize the overtaking speed of large airplanes. I would have thought radar would have had him, but it didn't."

Sam Freeman: *"Capt. Waters, would you care to make any proposals that you airline boys feel would improve the situation?"*

Capt. Waters: "I think the air taxi services should consider filing IFR in marginal weather. Usually these boys operate to within 10 or 15 miles of a control zone and then call for an ATC clearance when they find the weather is marginal. As a result they may be sent all the way up to Bridgeport or out to Flatbush, and that delays everything. If the air taxis would file IFR a good 60 or 70 miles away from the area, the way we have to, they'd be ahead of the game."

Marvin A. Everett (Instrument Flight Instructor, Pan American World Airways): "It might be smart to set up some kind of a procedure which would require air taxi pilots to comply with certain minimum qualifications before coming in under minimum weather conditions. I can picture the Idlewild tower directing an air taxi aircraft to a certain radio, and that plane coming up over Idlewild omni and making a slight turn which would put him on Runway 31 Right. That would be easy to do under three miles or two-and-a-half miles, and the tower would have him in sight from the time he left the omni station, provided he stayed at minimum altitude. Most

of the other or larger aircraft would be well above that altitude at the point.

"Another thing is position reports on approaching high-density areas. Some pilots give a position report and are 5 or 10 miles from the point they are designating as their position. It would help if there were some way of harnessing the position report so you could be sure it is within a 60° angle line of sight from the position they are referring to.

"Air taxi pilots should be educated regarding the high-density areas, so that all pilots are familiar with the area even under minimum visibility and ceiling conditions. Perhaps they should prove their familiarity by given flight checks, like the airline pilots are, every six months."

Sam Freeman: "That's an excellent proposal."

Marvin Everett: "Before coming here I asked a number of airline pilots about their experience with the air taxi aircraft, and they were unanimous in their opinion that the air taxis have given them no trouble at all. Much of the credit probably goes to the Idlewild tower which does a very efficient job of handling all traffic. Once in awhile you are going to get a stranger who will tangle things up, but that can't be helped."

Ed Dawson (Pres. Lehigh Aviation Service): "I don't come into this high-density area as often as Sam or Walt do, and I do know there are a lot of air taxi operators who aren't familiar with this area. It would be very helpful to us if the towers are

going to tell us to hold somewhere, that they mention some place that happens to be on the map or someplace we can definitely locate. On several occasions when I have come into LaGuardia or Idlewild I have been told to hold over a certain tank. From where I'm sitting I can look down and see 20 tanks, and I don't know which one is called what."

Marvin Everett: "Perhaps there should be some type of low visibility chart which would point out these particular areas to pilots who come into the area infrequently. That would help them become more familiar with the holding points. A chart of the area or a sketch which would include all the prominent landmarks used for reference would be very helpful."

Sam Freeman: *Greater use of Coast & Geodetic Survey local charts might be the answer.*

Ed Dawson: "If there were such a chart that we could use, we would be more than happy to carry it with us when we come into the high-density area."

Frank Glennan: "When we learn that a pilot is a stranger to the area, we try to be explicit about what we would like to have him do. When a pilot checks in with us, we assume that he knows the area, and so we give him the normal check points for his particular direction of flight. Occasionally we have air carrier pilots who are not too proud to admit they are strangers and ask us to help them out. Air taxi pilots would do well to do the same thing."

Ed Dawson: I always mention that I am unfamiliar with the area if somebody tells me to hold over a point that I don't know. However, more times than not, the tower does not answer this transmission. Maybe he is too busy for detailed instructions."

"Another problem is closing speed in strictly VFR weather as well as in minimum visibility weather. Sooner or later some thought is going to have to be given to getting everyone down to around the same speed in a high-density area, as far as is practical, of course."

Dick Washburn: "Sam, I'd like to add a little to what Ed has said about the other areas in the country. The problems you run into in high-density areas are peculiar to almost every airport in the country where you have mixed traffic, regardless of density.

"Our local pilots are familiar with the terrain, the fixes and all of the ATC terminology in our area, but if Sam Freeman were flying his air taxi to Charlotte, he probably would not know what the Tank Farm is, and that is an unofficial reporting point for us.

"The air carriers don't experience the problems we do for the simple reason that they operate continuously over known routes. On the other hand we seldom fly over the same route twice within a 30-day period. It is not unusual for us to make a trip to New York one day, Chicago the next, Miami the following day and maybe out to Los Angeles the next. It would be impractical from an air taxi operator's standpoint to carry on a training program

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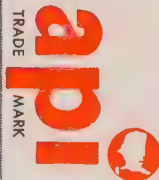
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Sam Freeman: "Pan American developed one a year ago." (See *Skyways*, Jan. '55. "Airport Qualification.")

John Groves (Eastern Regional Operations Mgr., ATA: "The congestion in this area is far and beyond that which any of us thought we would have. Our ability to move aircraft in this area certainly has deteriorated to a very low point. It isn't the inability of the man who moves the traffic, but it is the amount of traffic he has to move. At one time 850 movements a day into and out of LaGuardia was tops. Today, it is considerably more than that. I think we have to come up with some sort of system of handling traffic in this high-density area. I don't believe we have any more trouble with you air taxi people under marginal conditions than we have with our own airplanes.

"The helicopters give us a bad time these days. Today, the 'copter runs second in the number of movements into LaGuardia. Obviously, that is going to increase. It seems to me the industry and the CAA will have to sit down and find a solution to our terminal area problem.

"Very frequently the airlines can's even get into Washington unless they go up, as they wanted you to do, Walt, to 12,000 feet. The problem is one that is going to have to be attacked by all segments of the industry. We certainly want you air taxi boys to operate."

Sam Freeman: "The only suggested solution that seems to make sense is to try to keep the smaller airplanes at the lower altitudes. Perhaps we should work out channels which would bring air taxis in under the other aircraft, and a separate system for controlling them, and even a separate runway to land them on. I think all of us in the air taxi business can foresee that some sort of vertical-rising, short-landing aircraft will be the answer someday to at least the air taxi part of the business. It is not economically practical now, but it will be eventually."

John Groves: "Our chief difficulty with the helicopter operation is that the 'copter operators want to come down to lower minimums than they now have. He believes he can operate with less separation from fixed wing aircraft. I'm inclined to think he may be right, but only experience will prove that. His ability to take evasive action far exceeds that of the boys in the fixed wing aircraft, but how much latitude can we permit? You head out to Flushing Meadows and you see a 'copter coming down right in your face as you make your turn. You only see them once in a while now, but when there are more of them, what will be the answer? You will have to give them special routings which we've tried to do, but thus far it hasn't been successful."

Sam Freeman: "Does anyone else have anything specifically on air traffic?"

Marvin Everett: "In addition to air-taxi pilots being well informed regarding the area, it might be well to have some way of channeling this flight activity information to the pilots of the larger aircraft so they are aware of the fact that there are other channels being used to bring these smaller aircraft into the airports. If the carrier pilots were informed of the lighter aircraft procedures, if such ever is established, the air carrier pilots would be a little more conscious of the light planes, as well as the lighter aircraft being conscious of the heavier ones."

Frank Glennan: "I believe our radar surveillance could take care of that pretty well. Of course as traffic increases I don't know how much we are going to be able to call off, but normally the aircraft on approach gets all the traffic information we have.

Sam Freeman: "It might be well to work out separate procedures for large and small aircraft. When you go into Idlewild, as I did recently, you are picked up by radar. It was clear in the air but smokey on the ground, and radar worked us as they would a Boeing. We went out to Scotland Light and then came in a sequence behind an airline Boeing. Actually, I could have circled within the airport and the tower could have let me come right onto the runway they were using. I'd have been down and off the runway in short order, probably before the airliner even started in."

Capt. Waters: "The air taxi approach problem is very similar to the experience of the small trunk carriers and heavy

transient aircraft. Pilots flying non-pressurized equipment often find themselves No. 1 to approach LaGuardia, for instance, from altitudes as high as 6000 feet. The non-pressurized ship's slower approach exaggerates the delay for every other plane positioned behind him. This situation may be caused by: 1) pressurized planes that can be let down more rapidly from approach fixes; 2) altitudes being held open for non-stop luxury flights departing from Idlewild; 3) inability of pilots to give position reports at critical check points because of congested radio traffic or plane traffic. Until DME or its counterpart is inaugurated, the situation will remain the same.

"I do not believe that air taxi warrants special privileges at the expense of delaying larger planes. Visibility minimums should be established as well as ceiling minimums which must be adhered to by single-engine aircraft. I never would recommend establishing visual holding fixes owing to the difficulty of locating aircraft under marginal conditions.

"We must have controlled VFR arrivals, not only for single-engine aircraft but also for larger unpressurized aircraft in the short-haul category. A 45-minute delay to a transcontinental carrier is negligible, but to a small carrier it may be as long as the trip itself. Climbing ships to high altitudes high above smoke layers seems a ridiculous waste of time when aircraft can be held 1000 feet on top over a definite fix in plain sight of one another awaiting turns to land.

"Meetings are being held weekly to overcome the problems that are facing us in these high-density areas, and with the aid of the new long range radar coming into being in early 1957, many problems will be eliminated.

Sam Freeman: "Thank you, Capt. Waters. Now gentlemen, lets get on to the second phase of this discussion, which concerns the problems that come up after the air taxi gets on the ground.

"Hervey Law, you are familiar with this subject, would you care to elaborate along that line, specifically on what thought might have been given to the air taxi ground operations at the proposed new terminal at Idlewild, New York."

Hervey F. Law (Gen. Mgr., Airport Operations, Port of New York Authority): "We are definitely in favor of air taxi operations and we feel they have a definite place in the traffic into or out of our airports. Air taxis offer a valuable service to the air-traveling public. Therefore, we want to take care of that type of traffic as it relates to the airport.

"We have considered air taxis and private transient aircraft in planning for the new terminal and in what we call our Operations Building at International. LaGuardia has been a headache for all of us. As John Groves mentioned a few minutes ago, we were running around 800 and 850 arrivals and departures every 24 hours. Today, that has gone up to over a thousand, and one day we had over 1,040 in a single 24-hour period.

"Our gate positions at the present domestic terminal are completely overcrowded. We have tried to alleviate that situation by using the west part of the

field, the marine terminal area, for the handling of the private corporate ships and air taxis. As time goes on and gate positions become more critical, we will have to give further thought to it.

"We definitely want air taxis, but I'd like to bring out one fact: we cannot separate air taxis from the other type private and corporation aircraft. While a certain number of air taxi operators are members of your Air Taxi Conference, we have other air taxis coming in that are not. As public airport operators, we have to take care of them too, just as we do you. Of course, we do have some operating on permits with us which we must look after."

Sam Freeman: "I would like to take exception to one statement. Air taxis, whether they are members of the Conference or not, are primarily concerned with picking up or delivering airline passengers and so should be considered in a separate category from the ordinary transient or itinerant aircraft or corporation airplane."

Hervey Law: "Many of the corporate ships bring in passengers to make connections with the airlines, which makes them a type of air taxi."

Sam Freeman: "Let's put it another way. I believe consideration should be given to setting up parking areas for aircraft on a short-time basis, no matter whose aircraft they are, if they are connecting with the scheduled airlines."

Hervey Law: "We intend to do that at our new development at New York International. At the present time, we have no other space available that we are not using at LaGuardia. With the tremendous increase in traffic which will be coming in here and constantly increasing, I think more and more air taxis will be going into International. In its present configuration, LaGuardia is a headache to all of us. And I don't think there is much chance of a change in configuration at LaGuardia in the near future."

Sam Freeman: "What would be your position on allowing air taxi aircraft at Idlewild to taxi directly to the airline ramp? If we were bringing a passenger to National Airlines, would you be willing to allow us to go directly to National's gate?"

Hervey Law: "That would have to be an independent deal worked out between the air taxi operator and the individual airline because the airlines are in full control of all gate positions of their unit terminal."

Walt Laudenslager: "At our annual meeting at Phoenix a couple of weeks ago, we talked to the airlines directly and asked them, on a nation-wide basis through the Air Transport Association, to allow air taxi planes to go directly to their gates. It is our thinking that if the airlines will accept this on a nation-wide basis, then all that remains is to take up the problem on an individual airline basis at each airport. We have been asking for this for the past two years and have never gotten anyplace with it. This year the airlines have taken it under advisement. We hope that ultimately they will accept the idea."

Dick Washburn: "The problem in the terminal and high density areas are most pressing, but they merely point up the fact that those same problems exist all over the country. The other day in our local airport, a policeman came up to our counter and

announced he had at last done everything. The airport manager had called him and asked him to hang a parking ticket on an airplane at a gate! Certainly, that has solved our problem to a degree. We have gate space problems just as everyone else does. It is permissible to pick up and discharge passengers, but there is a 10-minute time limit at specific gates on the airport. If the airplane stays longer than its allotted time, it gets a five-dollar ticket."

Hervey Law: "In the new development plan for New York International, we will have 140 gate positions. If you can work out a deal with the airlines, there certainly should be enough flexibility for air taxis to go into gate positions. But you will have to work that out with the individual airlines."

Marvin Everett: "Some emphasis should be put on the distance an air taxi aircraft parks from a larger aircraft, particularly in the run-up area. I can recall looking back under the wing one day and seeing a Navion sitting there pretty close to the outboard propeller. If the airliner's engines had been run up, I don't know whether the Navion would have stayed on the ground or not."

Sam Freeman: "That's a problem most of us are aware of at these larger terminals. It always has been a problem at Idlewild because you are practically taxiing under the wings of those big jobs. In any planning of supply-aircraft parking areas, consideration should be given to such problems. I guess there have been cases of smaller aircraft being blown over."

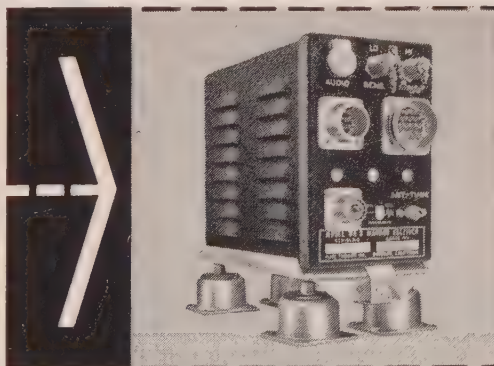
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Hervey Law: "That's right, but those aircraft were taxiing along the airport apron when prop blast hit them."

Sam Freeman: "Mr. Hardwick, as an air taxi passenger, would you care to make any suggestions for improving air taxi service?"

C. Cheever Hardwick (Partner, Smith, Barney & Co.): "There are one or two observations that I might make. First of all, I do not believe that air travel has reached its present position in the transportation field solely because of its speed. I think that the over-all factor of convenience is a matter of equal importance and may well prove to be a factor of even greater importance. From the standpoint of a consumer as well as a member of an investment banking firm that has raised money for some of the country's leading commercial airlines, I believe that feeder airlines are becoming increasingly important. This whole country of ours is changing very rapidly. We are witnessing a rapid decentralization which is both industrial and residential in character. People are moving further and further from the cities in which they work. From the point of view of the individual whose business activities call for extensive travel, the problem is not so much whether you wish to go by air as it is how long it takes you to get from your home or office to the airport of your departure and how long it takes to travel from your destination airport to your actual point of destination. My own case offers an example. I live some 40-odd miles outside of New York City and frequently have occasion to visit Chicago on business. There is a small airport about four miles from my home and it is possible for me to leave my house at 7:20 am, arriving at LaGuardia by air-taxi in time to make an 8 am flight to Chicago. I can keep an appointment in my Chicago office at 10:30 Chicago time, put in a full business day and be back at my home in New Jersey early in the evening. If it were necessary for me to fight my way to LaGuardia by train and bus or motor car with the reverse procedure to look forward to on my return trip, I can promise you that the airlines would lose a customer to the railroads, at least on the New York-Chicago run. I also find many

occasions to use air-taxi services in other sections of the country. In many relatively small cities, where commercial airline schedules are infrequent or spotty, I have found it most convenient to be able to shuttle by air-taxi to one of the major airports which do have a variety of flights to offer.

"To me at least, the air-taxi has proven to be a tremendous convenience. It has been in no small degree responsible for turning me into a confirmed air traveler and I believe that if the airlines cannot maintain an efficient means of funneling their passengers to their particular points of origin and destination, they will lose a lot of potential customers.

"As a frequent airline user as well as a banker, I sometimes wonder if the airlines are fully aware of the importance to them of an air-bus or air-taxi system which, in the opinion of their customers, is adequate to service their major flights. I believe that they should take a very real interest in the development of such a system in the consideration of their future growth possibilities."

Sam Freeman: "Mr. Miller, you use the air taxi service a great deal. What are your comments?"

Harry Miller (Pres., Harry Miller Co.): "The traffic and gate handling problem has been well covered, so I'm going to limit my comments to one or two precise points. One great lack is that you cannot make air taxi reservations through the airlines. This service supposedly is available, but the personnel of the airlines seem not to be acquainted with air taxis. You go to American, United or anyone else and report you are arriving in New York on Flight Number so-and-so, will they contact the air taxi company to have a plane there to fly you back to your home airport, in my case, Red Bank. Usually, the reservations people just look at you blankly and ask you what is an air taxi. You end up having to tell them what to do, how and when, and then nine chances out of 10 when you get to New York, no one at this end has done anything about it.

"Instead of going through all that, I usually phone Red Bank myself, tell Walt when I am arriving and where, and then I know the arrangements are set and that an air taxi will be there. But it would be a help if I could buy my whole ticket right at Walt's office on my ATP card—from Red Bank to LaGuardia to Chicago, back to New York, and back to Red Bank. It would help me on my tax deal, too, because I'd have one record of the whole transaction.

"Another thing is this business of airports. If you land air taxi at Newark and want to go to American's gate, you have a mighty long walk . . . and all with your luggage, too. The Port Authority is extremely cooperative in that if they have the personnel available and a station wagon, they will drive you over. That is fine, but it isn't the complete answer. The air taxi pilot should be able to pick you up or deliver you to the airline gate.

"The air taxi passenger in most cases is a businessman to whom time means money. Because of this, I believe the airlines should cooperate more than they have thus far. United Air Lines at LaGuardia has been wonderful. They let the air taxi plane pull

right into their gate. This is a fine operation, and it should be more wide-spread."

Sam Freeman: "A lot of thought has been given those problems, and I can assure you that even more will be given them. We are beginning to break the ice on this gate-acceptance business. You can be sure we will keep right on trying."

Dick Washburn: "I'd like to add something here, Sam. The Air Taxi Conference is in the process of negotiation with the Avis U-Drive-It system to make a reasonably close tie-in between their service and ours. Actually, we have three different and distinct phases of transportation to deal with. Number 1 is the long-haul portion of the trip by the air carriers. In many instances you have local area transportation problems which in high-density areas are met by helicopters. In the outlying sections you have town-to-town transportation which can be met by fixed-wing aircraft. That still leaves you without transportation, however, from the airport to the doorstep of the place you are going. We can overcome this with the U-Drive-It idea. We feel it will make an over-all system that is economical of time in the extreme."

E. E. Iremonger (Mgr., Tour Sales, United Air Lines): "We try to train our people to make arrangements for cars and air taxis, but we have such a turn-over of personnel that we often have a big job trying to get them to learn our own procedures without adding more. It is a problem, but I think that we will lick it eventually.

"I am certain the reservations personnel in this area know the air taxi operators, and that they will do everything to help the passengers and also the air taxi operators. Such public relations means a great deal."

Sam Freeman: "I'd like to ask one question of Mr. Glennan.

"Do you think it would help if the air taxi operators identified themselves in their contacts with the tower people? Instead of saying, 'This is Bonanza 1234' should they say 'This is air taxi 1234.' Then the controller would know that an experienced pilot was coming in."

Frank Glennan: "Our experience with Red Bank has been along those lines and it has been very successful."

Sam Freeman: "In other words you think it would be a valuable thing?"

Frank Glennan: "It's worth a try."

Sam Freeman: "Summing up this session, we seem to be in general agreement that traffic control as it affects air taxi operations in this high-density area is going to require more details to be worked out. Several good suggestions were made, namely, more area familiarization for air taxi pilots and greater use of more detailed local area charts, including C & GS local charts.

"The problem of gate space is acknowledged to be a major one by airport operators and it is one which will require working out with the airlines themselves.

"There also is a need for education of airline personnel so that air taxi service can be made more readily available to their passengers. In connection with this, there is the repeated request that permitting the air taxi plane to come in at the airline gate would make for better service for the airline as well as air taxi passengers.

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Weight & Balance

(Continued from page 12)

load at the wing butts. It is desirable to take into account the seating arrangement preferred by the passengers, if we can reasonably do so, to load them in an easily remembered, orderly sequence, and to avoid the necessity of moving them once seated. Passenger baggage is subject to the same practical limitations, and should be secured so as not to become a flying missile in the event of emergency de-acceleration. On aircraft where luggage is loaded in the cabin by reason of convenience or necessity, tie-down straps should be installed, and CAA approval obtained for loading baggage at these locations. On most aircraft, approval of these areas for hand luggage is a minor alteration handled on CAA Form 337, and presents relatively few difficulties. Fuel burn-off should follow a logical sequence. It will be shown later that this does not always consist of following a fixed system.

Familiarization with the general balance characteristics of the aircraft will greatly assist the trial loadings. Most conventional aircraft are expected to be nose-heavy in ferry condition, and tail-heavy with a full passenger load. This proved to be correct on the example aircraft giving a ferry CG at take-off of 108.8" with crew bags in the nose, necessitating their removal to the rear compartment. A D18S with an empty CG of less than the example aircraft might conceivably require a nose-fuel restriction in this instance.

Plots obtained by locating the CG opposite the corresponding weight as each tank is burned off are connected by straight lines to form the fuel burn-off patterns. Full-tank plots are circled and labeled according to the number of passengers, for identification purposes. Characteristic movement of the CG for each tank also aids in pattern identification. Successive patterns should be similar in appearance to the first one drawn. This symmetry provides a clue for successive loadings and operates as a check on the computations. On larger aircraft where symmetrical loading of passengers and luggage is possible, patterns need be drawn only for every other passenger, and answers found by interpolation.

Where the full-tank weight exceeds the maximum permissible for take-off, fuel is off-loaded in the same order as burned fuel, burn-off patterns plotted as before, in order to ascertain if fuel is being off-loaded properly from a balance standpoint, and a note added on the loading schedule as to the fuel restriction. The take-off CG is then found where the appropriate burn-off pattern intersects the vertical line denoting the maximum approved take-off weight, to be within limits at this point.

The fuel-management sequence of nose tank first, followed by rear tanks, followed by main tanks could not be used on the example aircraft with five passengers. The first trial loading resulted in the CG going to 119.4" or 21% out of limits as the nose tank was off-loaded first, moving forward to 118.9" as the rears were partially off-loaded in an effort to meet the take-off limitations. After reversing the procedure (off-loading rear tanks first, followed by 49 gallons of nose fuel), the CG still went slightly out of limits shortly after take-off

if the remaining nose fuel was consumed immediately after reaching cruising altitude. Positive control of the CG required burning the main tanks down to approximately 2/10 before switching over on the remaining nose fuel. A more rearward resultant than that obtained here would indicate the desirability of relocating some item of fixed equipment to improve the empty CG, or a more forward fuel distribution. Fuel must not be used as ballast. Ballast fuel is any fuel whose ultimate consumption would result in a CG travel beyond the approved limits. At any given time during the flight, fuel may be used to control the balance, provided the fuel-management procedure permits consumption of that fuel with a permissible CG.

The effect of changing passenger seating may be found by computing the effect on the CG with full tanks and empty tanks, under the conditions where a seat is available for the change, and averaging the results. Temporary operation without a copilot, and changes in fixed equipment are treated similarly. The procedure is reasonably accurate for one or two changes and extends the useful life of the solution.

If desired, the charts may be redrawn with pen and typed. Once completed, the CG at any time may be found vertically above the corresponding gross weight on the fuel burn-off pattern appropriate to the number of passengers. Take-off weight *with full tanks* (or maximum fuel weight) is always found vertically beneath the circled plots denoting full-tank CG, or will be the maximum permissible for instances where the fuel load was restricted. The take-off weight with less than maximum fuel may be found by proceeding from the maximum fuel weight on the base line, parallel to the weight-reduction lines, to a point opposite the fuel-remaining (or total fuel at take-off in this instance), and then projecting vertically downwards to the base line. Noting the corresponding CG at this point for take-off purposes, the approximate landing weight and CG may be found by continuing from the point opposite the total fuel at take-off, parallel to the weight reduction lines, to a point opposite the fuel at destination, and then projecting vertically upwards. The take-off and climb correction is not applied when the method used to determine the in-flight fuel provides for this factor (use of fuel gauges enroute, or the fuel forecast for determining fuel overhead destinations, etc.). A combination of weight and consumption may be handled in this manner. The elapsed-time scale is direct reading only for a full-tank take-off, and cruising thereafter at the consumption for which the time ordinate was scaled.

The example, "Loading" Figure 2, is open to valid criticism. All desired conditions were not met. The nose tank was not always burned first, and the fourth passenger was inconvenienced by loading his luggage in the nose even though space was available in the rear compartment. Reasonable success was attained in establishing a practical sequence of loading passengers.

There are several other methods for loading the example aircraft in a satisfactory manner. Exact handling of baggage and the other practical considerations should be left to the pilot for solution.



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NBAA

(Continued from page 35)

The ACC NAV Panel also recognizes that the details of all future problems and solutions cannot be foreseen today. Adjustments in implementation programs will be necessary from year to year consistent with new requirements, developments, and concepts; and to this end the panel anticipates periodic reviews of progress and future plans. However, the plan, if modified to provide for an adequate funding level in FY 1957, represents the best available estimate of the measures needed to attain an improved system. To envision correction of deficiencies on any smaller scale would be wholly unrealistic.

Weather Bureau Issues Series of Pilot Weather Pamphlets

The U. S. Weather Bureau is now publishing an Aviation Series designed especially for the pilot who wants to increase his weather wisdom. This series is composed of special pamphlets on flying weather. Each issue consists of an eight-page booklet, and discusses a phase of aviation weather directly from the pilot's point of view. Emphasis is on helping the pilot apply weather knowledge to practical flight problems. To date, seven pamphlets have been issued, titled as follows: No. 1. Flying Weather Forecasts: How Useful Are They?—No. 2. Ice on Aircraft: Its Causes and Effects.—No. 3. The Jet Stream: A Band of Very Fast Winds Found at High Altitudes.—No. 4. Turbulence: Its Causes and Effects.—No. 5. The Mountain Wave: What It Means to the Pilot.—No. 6. Storm Detection Radar: How It Helps the Pilot.—No. 7. Thunderstorms: Part One.

Each of these booklets is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 5¢ a copy.

CAB Safety Bureau Proposes Part 27 Changes

The Bureau of Safety Regulation of the CAB has under consideration a proposed revision of Part 27 of the civil air regulations which would make it permissive for organizations who have aircraft dispatchers not in scheduled airline operations to qualify them under its proposed changes. The Bureau set a Feb. 10 deadline for comments from the industry on the proposed revisions for aircraft dispatcher qualifications.

The original rule, adopted in 1940, established the current requirements for the issuance of dispatcher certificates, but the regulations preclude the possibility of a person securing a dispatcher certificate in other than scheduled air carrier or scheduled military operations. Effect of the new ruling would mean, for instance, that organizations such as corporate fleet owners or fixed-base operators, who already have personnel competent to become dispatchers, could have them qualified under the new regulations.

The Safety Bureau has revised Part 27 to make it conform more closely to the newer airman parts, has clarified the section pertaining to skill, made substantive changes in experience requirements, and

deleted the recent experience provision.

The Bureau has expressed its hope that the revision of Part 27 will encourage the voluntary establishment of dispatch organizations, when practical, in other than scheduled air carrier operations.

ALPA Pilot Warns Holding Patterns Should Be Flown with Precision

Winter weather conditions are causing more aircraft to fly in holding patterns and it is imperative that these patterns be flown with a high degree of precision, says Capt. R. A. Stone of ALPA in the business pilots' safety bulletin of Flight Safety Foundations.

In some high-density areas, holding patterns are close to each other and aircraft may be held at the same altitude in adjacent patterns, Captain Stone points out.

The design of holding patterns is predicated upon the aircraft being flown at 156 knots, Captain Stone adds, explaining that a buffer zone is built around the pattern to allow for variations in navigation and speed control. If the aircraft is flown at excessive speeds, he warns, its increased turning radius may cause it to exceed not only the standard holding pattern but also the buffer zone and air space allotted to an adjacent holding pattern.

Another cause of exceeding the holding pattern air space, the Captain cautions, is less-than-desired precision in navigation facilities. The holding pattern, he further points out, must be originated from an accurately identified position before the aircraft can be flown within the specified pattern.

Boggess Announces New Advisory Council Within NBAA Structure

Henry W. Boggess, NBAA president, recently disclosed the formation of an executive advisory council within the organization to begin a broad program to educate leading executive aircraft owners on the problems of business aircraft operations.

Many executive aircraft owners, Mr. Boggess said, explaining the action, assume that when they purchase an airplane and hire a flight crew that their problems have been solved. Actually, he said, many of them have just begun.

In the outlined educational program, a group of leading corporation officials will meet periodically to discuss corporate flying problems. An initial meeting was recently held in New York and, later, another meeting was held in Washington. Aviation industry officials will be invited to participate in these discussions.

Among other measures slated for action by the council is a discussion of the dues structure of the association. One proposal would have the dues made proportional to the member's fleet and the amount of his flying activity.

AERO CALENDAR

Feb. 7-9—Society of the Plastics Industry, Reinforced Plastics Div. conference, Chalfonte-Haddon Hall, Atlantic City, N. J.

Feb. 22-24—Fifth annual Ohio-Indiana Agricultural Aviation Conference, Ohio State University, Columbus, Ohio.

Now Hear This

(Continued from page 5)

G. Nathan Calkins, Jr., chief of the International and Rules Division, General Counsel's Office of the CAB, has announced his resignation. Mr. Calkins plans to open an office for the general practice of law in Washington, D.C.

Clifford A. Brooks recently was promoted to advertising manager for Pratt & Whitney Co. He succeeds Vas L. Howe who has resigned.

R. K. Thompson was appointed assistant manager, Manufacturing Service Division of Holley Carburetor Company.

Norman S. Benedict has joined the Aviation Safety staff at University So. Cal.

Thomas Hackett has been named product improvement manager of the Chandler-Evans division of Pratt & Whitney. **Ercole J. Vitali** was named Asst. Chief Engr.

Crockett A. Harrison has been named to head a new market research and development department established by Bendix Aviation Corp.

H. J. (Joe) Chase recently was named works manager for Lockheed Aircraft Service-International, N.Y. Inter. Airport.

William A. Uline has been appointed staff assistant to the general manager of the Pioneer-Central division of Bendix.

Robert H. King recently was named assistant plane manager of Rheem Manufacturing Company's Downey, Calif. plant.

COMPANIES

Collins Radio Company has acquired 100 per cent ownership of Communication Accessories Company, an electronics component manufacturer. The new subsidiary will operate as an independent unit in the components field.

Fletcher Aviation has been awarded an Air Materiel Command contract for jet-tisonable wing tanks. The tanks, with 1700-gallon capacity, will be used on B-47 heavy bombers.

Bell Aircraft Corporation and **Emerson Research Laboratories** have been elected to membership in the Radio Technical Commission for Aeronautics.

Tubular Service & Engineering Co., of Houston, Texas, has purchased the complete inventory of *Navion* factory-built parts as well as the rights and production tooling needed to manufacture additional quantities of parts, from Ryan Aeronautical Company. The *Navion* activity will be operated at Galveston, Texas.

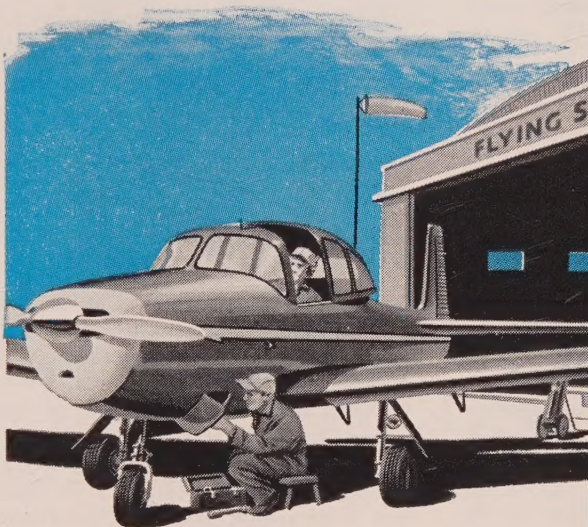
Joseph A. Anderson, general manager, AC Spark Plug Division of General Motors, recently was selected to receive the "Out-standing Achievement Medal" of the University of Minnesota.

AC Spark Plug Division of General Motors has established a nationwide Tire, Battery and Accessory Advisory Council. Present plans call for the council to meet twice a year.

Fairchild Engine & Airplane Corp. has been authorized, under the terms of its option agreement with Royal Netherlands Aircraft Factories Fokker, to begin conversion engineering on the F-27 turbo-prop transport. This will enable Fairchild to maintain its late '57 delivery dates for the 40-passenger transport.

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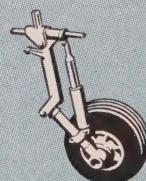
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(Continued from page 33)

CAB Schedules All VOR Changes by Late 1957

Unquestionably spurred by the threat posted by the TACAN/VOR controversy, the program to improve the performance of the VHF omnidirectional radio ranges along the airways has been accelerated and now calls for completion in late 1957.

Already well along, the \$900,000 program calls for the conversion of all VOR antenna systems from five to four loop arrays. Another important contribution to greater accuracy is the ground measuring equipment developed by the CAA now in use for checking VORs.

The four loop antenna array for the VOR was developed and evaluated at CAA's Technical Development and Evaluation Center at Indianapolis, where, under near normal conditions, VOR course accuracy of plus or minus 0.55 of a degree maximum error was attained on the VORs located at Indianapolis airport. Present operating tolerances of VORs now on the airways are plus or minus 3.5 degrees.

In addition to providing greater accuracy under all but unusual conditions, the improved four loop VORs will present better indications on the cockpit instrument regardless of the attitude of the aircraft. The antenna modification will narrow the "cone of confusion" immediately over the station where no positive bearing information is possible. The four loop array also makes possible a smoother transition on the "to" and "from" indicator, which shows whether the pilot is flying toward or away from the VOR station.

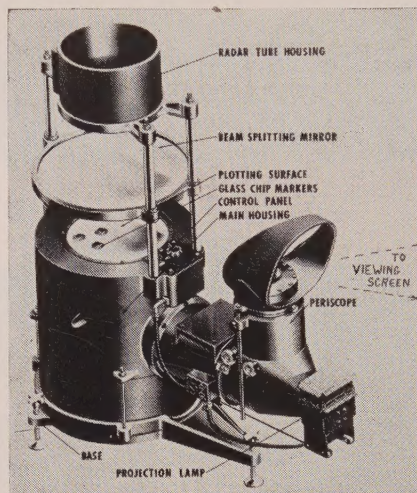
In all, 406 VORs will be converted to the four loop array. A total of 65 already have been completed while 35 are in the process of changeover. New VORs and those purchased within the past several years were manufactured with the four loop system.

Collins Announces New Airborne DME System

Collins Radio Company, Cedar Rapids, Iowa, plans to market a civil airborne distance measuring equipment (DME) designed to work with the presently installed CAA ground system. The company revealed that National Aeronautical Corporation, Ambler, Pa., is designing the equipment to be compatible functionally and quality wise with Collins' aviation equipment. Sales and service will be handled by Collins.

Air Force Tests Northrop Radar "Sky Screen" Dev.

A new optical projection device, called a "Sky Screen," capable of faster and more accurate transmission of radar data onto a viewing screen for aircraft control and identification, is now being produced by Northrop for the U. S. Air Force.



Sky Screen, composed of an unique arrangement of mirrors, adjustable lenses and projection equipment, was perfected by Northrop-Anaheim, working from a basic concept of the Control System Laboratory, University of Illinois, and from prototypes developed by the Intelligence Production Engineering Branch of the Rome Air Development Center.

The plotting device speeds filtering and relay of radar information. Its operator uses varicolored glass markers to follow manually the radar-indicated route of aircraft on Sky Screen's optical plotting surface. Movements of the markers are instantly and directly projected onto a large room-size screen for easy visual reference and nearly all human relay of vital radar information is eliminated.

In addition to aircraft tracking at air defense filter centers, Sky Screen has an important potential use for airport air traffic and ground control.

Use of Sky Screen allows more efficient utilization of personnel by requiring less operator training, by reducing two-thirds the personnel previously needed to operate systems for the same purpose and by enabling a single operator to handle several times as many aircraft tracks as possible with other systems.

Only controls needed for the optical unit are for focus, magnification and projector light intensity. In addition, its periscopic projection head swivels a full 360 degrees for greater flexibility in Sky Screen location. A variable focal length lens system permits simple and rapid focusing and vari-

able magnification from any distance within its design range. (See cut.)

Operative principles of Sky Screen are relatively simple. A radar tube is mounted in the top section of the device. A specially-designed optical plate (beam splitting mirror) transfers incoming radar information onto a 16-inch plotting surface. Glass chip markers are moved by operator on plotting surface to coincide with target locations and directions indicated by reflected radar pattern.

Before the development of Sky Screen, plotting systems required specially-trained personnel to translate radar "pips" to verbal directions, additional personnel to plot this information in reverse on a vertical transparent surveillance screen. Sky Screen operation requires only visual superimposing of markers on the radar pips. Increased accuracy of the plotting device can be attributed directly to its elimination of most translations and all transmission error.

ARDC "Cat's Eye" Tube Sees Ground at Night

One of the inevitable "foregone conclusions" in the combined aviation-electronics field is that someday soon, aerial navigation will be 100% "visual," unaffected by darkness or weather. Starting with radio homing and aural radio signal interpretation, we have progressed to following airborne indicating instruments and finally to an airborne radar "picture" still requiring skilled interpretation.

The Air Research and Development Command based at Baltimore, Md., has now announced an optical amplifier which enables airmen to see in the dark with "daylight" clarity. Known popularly as "Cat Eye," the system is designed to be used either by a human pilot, or in conjunction with instruments such as computers or automatic navigation equipment.

Working on principles similar to TV, the device is approximately 1,000 times more light sensitive than a standard TV camera. It presents a cathode ray tube image not unlike a TV picture. Even when used under the poorest lighting conditions at night, the tube presents a clear, sharp picture. In a flight test at the Wright Air Development Center, where the tube was conceived, airborne observers were able to see the ground clearly on a moonless, winter night.

"Cat Eye" senses and amplifies the always present light unseen by the human eye. "Photons," the electromagnetic waves which appear as light to the eye above certain frequencies, are sensed and imaged on a photo-sensitive surface. There they are

(Continued from page 55)

Navicom

(Continued from page 52)

transformed from photons to electrons, accelerated and produce electrostatic images. These are further amplified and are sensed by an electron beam. The resultant signal is again amplified onto the cathode ray tube.

Thus, "Cat Eye" is able to "see" where the human eye and other electronic instruments cannot because of its ability to increase the contrast between light and dark. This might be likened to a television viewer changing the contrast control on his TV set. Although development work has been aimed primarily at a black-and-white picture presentation, ARDC scientists say the optical amplifier also can be used for color.

In aeronautical terms, the obvious advantages of conducting "visual" ground contact navigation with reference to recognizable landmarks and topography, as compared to even the best current radio navigation in sparsely developed areas, should make this development one to watch in the immediate future. Both by night, and in dusk or dawn or smog conditions when contrast is the weakest, the "Cat Eye" device holds promise for both ease of navigation and possibly improvement of traffic detection visibility and hence directly greater safety.

Air Force Develops Visual Multi-DF Scope

Despite all the advances in ground and airborne navigation devices, pilots still get lost, often through no fault of their own. When they do, two disturbing conditions become of immediate prime importance: finding their locations before running out of fuel, the obvious collision threat to all other aircraft in the vicinity, plus the ensuing delays.

With DF radio, valuable time is consumed in attempting to pinpoint available cross-fixes and often, lack of distance information may mean an unacceptably long procedure of rescue. Radar has done a great deal to assist in this situation, but it also demands a time-consuming series of maneuvers for location and identification which may be negated by precipitation conditions. A step forward was achieved when ground DF signals were first transposed and displayed on an associated radar scope.

Now ARDC has come out with a visual multi-DF scope unit that can combine the signals of several DF units and provide a simultaneous presentation on a large cathode ray tube similar to that of a TV or radar

(Continued on page 56)

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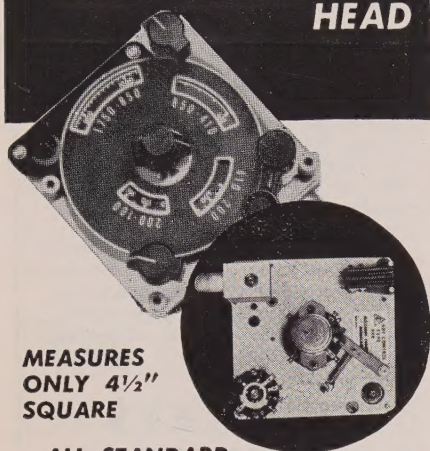
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system. Suitable for installation in a control tower (such as one of several in a hi-density multi-terminal area) the aid (technically called the AN/USA-3) enables the operator to "see" the exact position of an aircraft in distress, or for identification and traffic control purposes.

Provided with an overlay map of

the surrounding area, the picture projected on the screen includes lines emanating from the DF units to corresponding points on the map. The controller is thus able to fix the exact position of the plane instantaneously by noting the position of the plane's radio signal which appears on the map.

CAA To Modify ASR Radar For Better Scope Display

CAA early next summer will begin a program of modification of its airport surveillance radar (ASR) instal-

lations to obtain a better picture of aircraft on the radar scope during rain and snow storms. The modification will change the existing method of vertical and horizontal polarization to an omnidirectional combination of both, or circular polarization.

In the program, 25 existing ASR installations will be changed over and work will start when conversion kits have been manufactured. Initially, CAA will modify radars at eight high-density traffic locations—LaGuardia and Idlewild, New York; Washington; Boston; Cleveland; Atlanta; Los Angeles and Chicago (O'Hare).

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